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TELEPHONY REACHES, WEEKLY, EVERY TELEPHONE BUYER IN THE WORLD

Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Sound Waves, Telephone Magazine, and The Telephone

PUBLISHED WEEKLY BY THE TELEPHONY PUBLISHING COMPANY, MONADNOCK BLOCK, CHICAGO

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1889—Paris Exposition Medal for Rubber Insulation 1893—World's Fair Medal for Rubber Insulation
OKONITE TRADE MARK REG. U.S. PAT. OFFICE
THE STANDARD FOR RUBBER INSULATION
OKONITE WIRES, OKONITE TAPE, MANSON TAPE, CANDEE PAT'D POTHEADS
THE OKONITE CO., Ltd. Sole Manufacturers 253 Broadway, New York
WILLARD L. CANDEE, H. DUMANT CHEEVER, Managers W. H. HODGINS, Secretary GEO. S. MANSON, Superintendent W. C. CANDEE, Asst. Secretary
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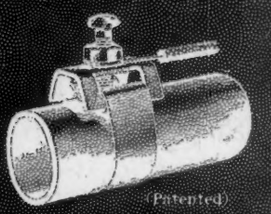
Vitrified Fire-Clay
CONDUIT
Guaranteed Best
THE CLAY PRODUCT CO.
738 Stock Exchange Bldg.
Factory at Brazil, Ind. CHICAGO

CHAS. G. STEVENS CO.
BRIGHT COLD ROLLED AND COLD DRAWN
NORWAY IRON, MAGNET STEEL
Cold Drawn Steel—Rounds, Flats, Squares, Hexagons.
COLD ROLLED STRIP STEEL
LARGE STOCK ALWAYS ON HAND.
58-60 South Canal Street, CHICAGO

McROY CONDUITS
CHICAGO
ROOKERY BUILDING

KERITE
Insulated Wires and Cables
1850 DAYS KERITE 1908
The Insulation which has withstood successfully the test of half a century
W. R. BRIXEY, Sole Manufacturer
HUDSON TERMINAL
30 Church Street, NEW YORK

CHICAGO TELEPHONES SATISFY
CHICAGO TELEPHONE SUPPLY CO.
FACTORY AND GENERAL OFFICES
ELKHART, IND. U.S.A.

NEW YORK GROUND CLAMP

(Patented)
for connecting telephone ground wires to pipes or cables without the use of solder.
Adapted to any size of iron or lead pipe.
Makes a firm and permanent electrical connection.
Used by Independent Telephone Companies everywhere.
Approved by National Board of Underwriters.
YONKERS SPECIALTY CO.
Yonkers, N. Y.

"DETROIT" RUBBER COVERED WIRES
Telephone Pair a Specialty
DETROIT INSULATED WIRE CO.
Detroit, Mich.

PLATINUM
Wire, Sheet, Rivets and Contacts
Send for Literature
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N. Y. Office: 30 Church Street

TELEPHONE CABLE
WATERBURY CO., 69 SOUTH STREET, NEW YORK CITY

ALPHABETICAL INDEX TO ADVERTISEMENTS ON PAGE 22

Peirce Specialty Company

ELKHART, INDIANA

Engineers, Designers and Manufacturers

Peirce Specialties

All Steel Pole Brackets, All Steel House Brackets, All Steel Transposition Brackets, Pole Seats (5 Designs), Cross Arm Back Braces (Channel Steel), Distributing Circles (3 Design), Fastenings for twisted pairs, Expansion Bolts, Hammer Drills for Drilling Masonry, Test Connectors and Cable Hangers.

The Indiana Rubber & Insulated Wire Co.

MANUFACTURERS OF

Insulated Wires and Cables

JONESBORO, IND.

We Make Toll Tickets by the Million

By means of new facilities just acquired, and thus produce them better and cheaper than can be done in small lots. We can furnish them promptly in any quantity, on better paper, put up in better shape, and at LOWER PRICES THAN EVER BEFORE OFFERED.

WE ALSO FURNISH

Lease Records	Directories
Toll Journals	Trouble Tickets
Toll Ledgers	Rental and Toll Bills
Monthly Check Reports	Voucher Checks
Cash Books	Card Index Systems

Steel Telephone Signs

All kinds of Blanks, Forms and Books for Telephone and Toll Line Accounting.

Write for Sample Forms and Prices.

THE TELEPHONE PRINTING COMPANY

DEFIANCE, OHIO

HOW TO USE THE WILLIAMS TEST CLAMP

Hold clamp between thumb and first finger, then press together, causing the jaws to open wide. Insert the wire you are to test in the valley or groove and release the pressure, allowing the needle points to come down on the insulation with a clean bite. Then with the thumb on the stud or screwcap press the jaws together firmly. This will force the needles through the insulation, making a good contact with the conductor, which contact the spring steel jaws will hold steadily while the test is made. Send 75c. for a set (2) postpaid. Your money back if you want it.

The Williams Test Clamp Co.

720 Electric Bldg. Cleveland, O.

IF YOU HAVE MONEY TO BURN

it does not make any difference to you whether your telephones get out of order or not, but if you are in business to make money, not to spend it, the best telephone you can ge s the one you want to buy. The Andrae Special Heavy Giant will last more years with less repairs, ring stronger and talk further than any other telephone to be bought at any price.

It is easy to prove this. Put one or two on your lines and compare them with others and then ask for our guarantee.

JULIUS ANDRAE & SONS CO.

48 YEARS KEEPING MONEY OUT OF THE FIRE AT MILWAUKEE, WIS.

MONNOT COPPER-CLAD STEEL WIRE

NON-CORROSIVE **HIGH TENSILE STRENGTH**

FURNISHED BARE **RUBBER INSULATED**

WEATHERPROOF

Manufactured by Duplex Metals Co. 208 Fifth Avenue New York

Construction Material

GALVANIZED Telephone and Telegraph Wires, Cross Arms and Braces, Pins, Brackets, Insulators, Pole-Steps, Lag Screws, Clips, Machine Bolts, Carriage Bolts, Shims, Messenger Clamps, Lightning Arresters, Guy Anchors, Ground Rods.

Our Stock of Construction Material and Appliances is Complete and Adequate in Every Way. Send Us Your Orders.

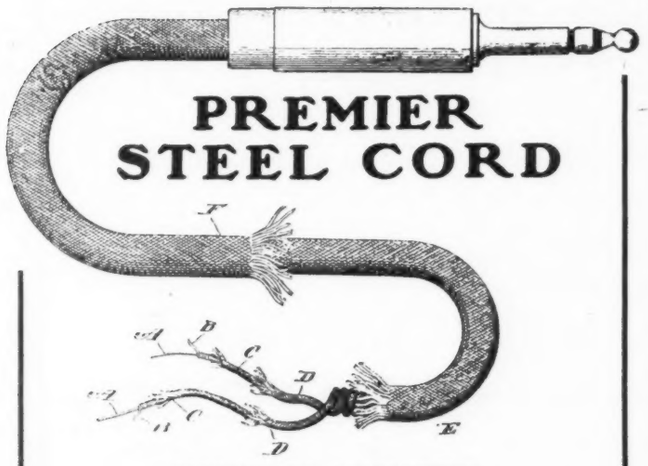
Specify Okonite wherever a Rubber Covered Wire is needed.

OKONITE IT NEVER DISAPPOINTS

Central Electric Company.

264-266-268-270 FIFTH AVENUE CHICAGO

OKONITE IT NEVER DISAPPOINTS



PREMIER STEEL CORD

ALWAYS IN ALIGNMENT

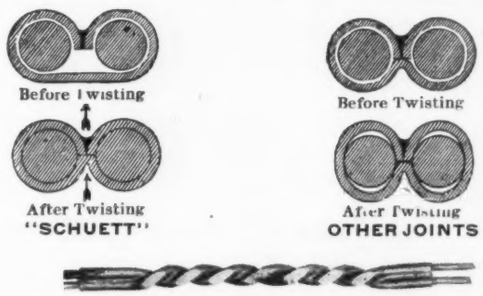
In the hollow of the cord at the plug end, there's a reinforcing spring made of the highest grade spring steel. Not only does this prevent the conductors from being thrown out of alignment, but it also makes it practically impossible to break the cord at the plug end, and that's where the strain is greatest. Operators don't have to be careful when you use Premier Steel Cord—it'll last in spite of shamefully careless usage. Better get details.

Runzel-Lenz Electric Mfg. Co.

97-101 South Clinton Street, Chicago

"SCHUETT"

Is Synonymous With Success



—**that's** the first reason why they are preferable to any and all others

"THE SCHUETT"

—**insures** an absolutely ideal and lasting connection

—**air** nor moisture cannot penetrate or corrode

—**the** joint is stronger than the wire itself

Our List is Lowest—Discounts BETTER

Schuett Manufacturing Co.

17 West Madison St. CHICAGO

To inspect the hook switch, loosen the knurled nut at top of stem. You do this with your fingers; there are no mysterious "catches" or patent spring locks to monkey with.

As soon as the nut is loose, the casing may be removed. Now you can see every working part and every wire, and yet every part is operative. There is not a sliding contact in the stand. Every connection is soldered.

By removing one screw in the center of the base, the cord terminals are reached. These are of generous size, so you don't need a watchmaker's screwdriver to put in a new cord.

The hook lever is the part that usually "gets it" when the stand is knocked over, so we put this on with a screw. Another lever can be put on in an instant, as shown. No adjustments.

WHY do some stands pull apart into many different pieces? You can't test them when they are apart, and can't see the parts when they are together. What's the use?

Get our Bulletin No. 63

The Sumter Telephone Mfg. Co.

SUMTER, S. C.

RUGGED AND EVER READY

OUR No. 51 JUMBO MAGNETO

None so powerful, none so desirable for heavily loaded rural lines

Get busy; we are ready, you should be

The Standard Telephone Mfg. Co., Portsmouth, O.

SUCCESSORS TO

The Williams Telephone & Supply Co.

The Drake Telephone Co. The Knox-Dickey Telephone Mfg. Co.

Write Us About Our Four-Party Common Battery Selective

If You Consider THE POOLE

Lock-Out System

as an addition to party-line service, you are wrong. It is not something added—it is a feature which has always belonged to good service. It unfailingly gives absolute

SECRECY

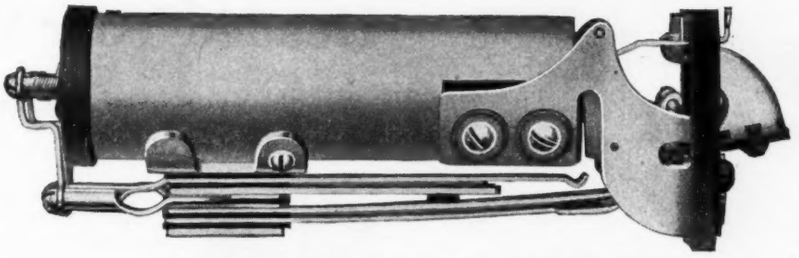
to any of the parties on the line. It gives the subscriber all the advantages of a private line at the cost of a party line. It enables you to put more parties on a line, and get higher rates.

Now, do you want details?

Mountain State Electrical Co.,

Wheeling, W. Va.

No. 8 Self-Restoring Gravity Drop



150-Line Magneto Switchboard

TWO SECTIONS—UNIT TYPE—FOOT RAIL BRACKET

Quality Woodwork

¶ The only switchboard Cabinets that wear as well as they look. All made in our factory.

¶ The cable forms inside are neatly and conveniently arranged.

Quality Apparatus

¶ The kind of tool-made apparatus that lasts long after quality is forgotten.

¶ Every piece of apparatus in this board is "Quality Apparatus."

A 5360 Oak Switchboard Cabinet—Mission Finish

¶ To the Man-Who-Buys—the real question is: "What KIND of service is this switchboard going to give me five years from now?"

¶ *Ask yourself that* when you are selecting a magneto switchboard equipment.

¶ *Stromberg-Carlson* Magneto Switchboards are recognized everywhere as the very HIGHEST TYPE of strong, simple, clever construction, combined with most durable and lasting finish, PLUS the most efficient and economical Quality Apparatus that lasts.

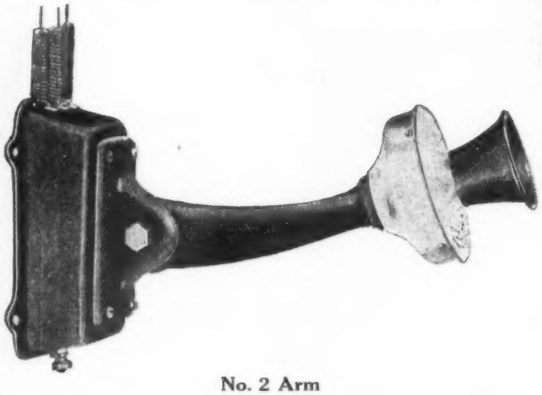
Tell Us Your Needs—We Will Gladly Submit Prices

STROMBERG-CARLSON TEL. MFG. CO.

ROCHESTER, N.Y.-CHICAGO, ILL.

No. 1 Arm

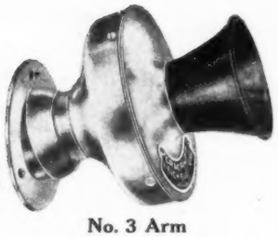
LOCAL BATTERY TRANS. NO. 1L.
COMMON BATTERY TRANS. NO. 1C



No. 2 Arm

Are These Transmitters Headed Your Way?

We Want Your Transmitter Business
They Make Satisfied Customers



No. 3 Arm

Cracraft, Leich Transmitters are alive and ready to transmit the first as well as the last syllable the instant the receiver is removed from the hook.

WRITE AT ONCE
For Information and Prices

Cracraft, Leich Electric Co.
GENOA, ILL.

THIS SWITCHBOARD

Is equipped for our Direct Current Four Party System.

A battery of dry cells furnishes the ringing current and no pole changer or other ringing device is necessary.

The ringers operate on the principle of a vibrating bell and battery is only used when ringing —there is no waste.

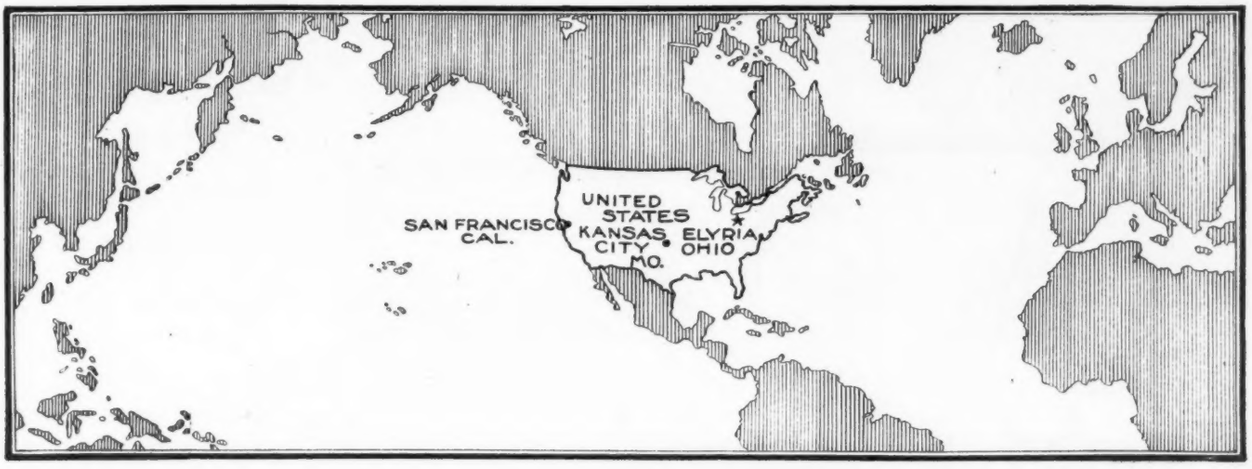
The equipment needed to install this system is inexpensive and the cost of maintenance is extremely low.

Write us for particulars.

MONARCH TELEPHONE MFG. CO.

Factory and General Office:
Washington and Morgan Streets, CHICAGO, ILL.

Branch House:
177 Main Street, DALLAS, TEXAS



WHERE and WHY?

¶ Elyria is a city of 18,000. It is 25 miles — one hour by rail or trolley — from Cleveland (445,000).

¶ Elyria's twenty manufacturing plants have a total average monthly pay roll of over $140,000.00.

¶ The main line transcontinental trains of the New York Central Lines, pass within a few feet of the Dean Electric Company's shipping room.

¶ This is a strategic location for promptly covering the East, the South, and Eastern Canada. Foreign shipments are delivered, without transfer, to New York wharves.

¶ Dean Branch Houses are as nicely located as the factory.

¶ Export trade is readily handled, and the United States are thoroughly covered without entailing the heavy expense of needless stocks.

¶ Kansas City is the center of the Middle West and Southwest.

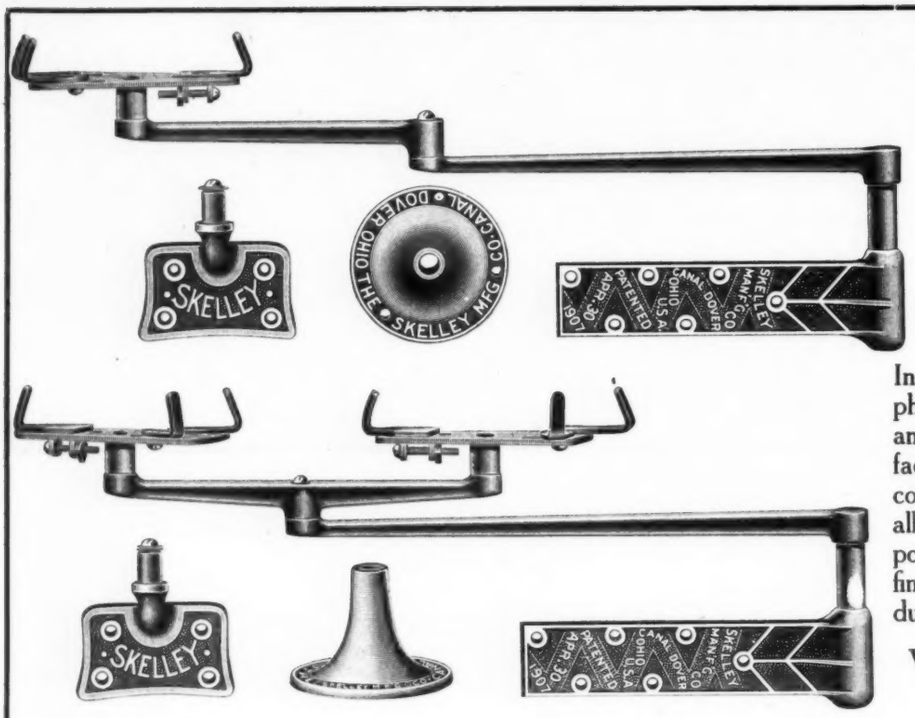
¶ From a complete stock of all standard telephone apparatus, carried in our San Francisco Branch House, prompt deliveries are made to the Pacific States, Western Canada, Alaska, Central and South America and the Orient.

THE DEAN ELECTRIC COMPANY

Telephone Apparatus

Elyria, Ohio, U. S. A.

San Francisco Kansas City



The Improved Skelley Telephone Holders

For One or Two Telephones

In making a choice of Telephone Holders, action, finish and durability are important factors. The Skelley Holder combines the best features of all the others and has no bad points. Its action is perfect, in finish it is second to none. In durability it is easily first.

Write us today for circular and prices.

The Skelley Manufacturing Co.

Davis Avenue and Fifteenth Street — Canal Dover, Ohio

Gould Telephone Storage Batteries

DESIGNED with a full understanding of the conditions of telephone service and built electrically and mechanically to meet these demands.

Gould Storage Battery Co.

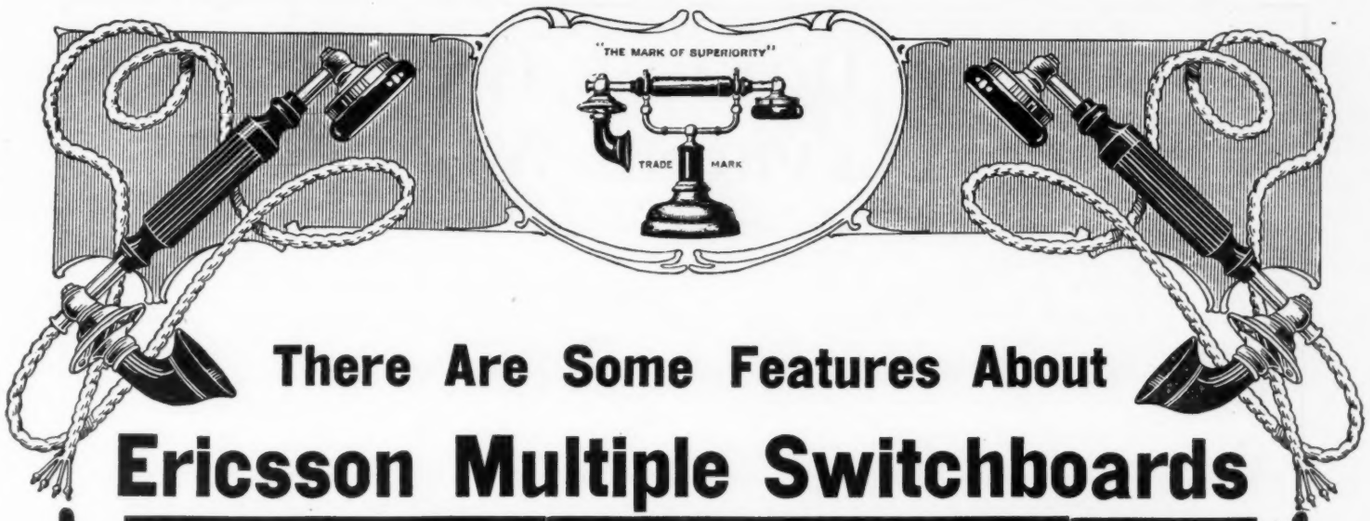
MAIN OFFICES: 341-347 Fifth Ave., New York City
Works, Depew, N. Y.
SALES OFFICES: Chicago—Rookery Building
Boston—89 State Street
San Francisco—Monadnock Block
Toronto, Ont.—2 Bloor St., E.

THE WESTINGHOUSE STORAGE BATTERY

Ask for Catalog 256-J

The Westinghouse Machine Company

Storage Battery Department
East Pittsburg, Pa.



There Are Some Features About

Ericsson Multiple Switchboards

That The "Other Fellow" Can't Duplicate

On our 2800 capacity Common Battery and Magneto Multiple boards, **the top of the multiple is only 57″ from the floor**—that's where the multiple begins on boards of other makes.

Figure out the operator's reach on **this** multiple board and see how it compares with **others** you have seen.

You cannot find another switchboard where **150 self-restoring drops with jacks** are fitted in a panel **7″ x 21½″** and where **one single nut** holds the individual jack and drop in the panel.

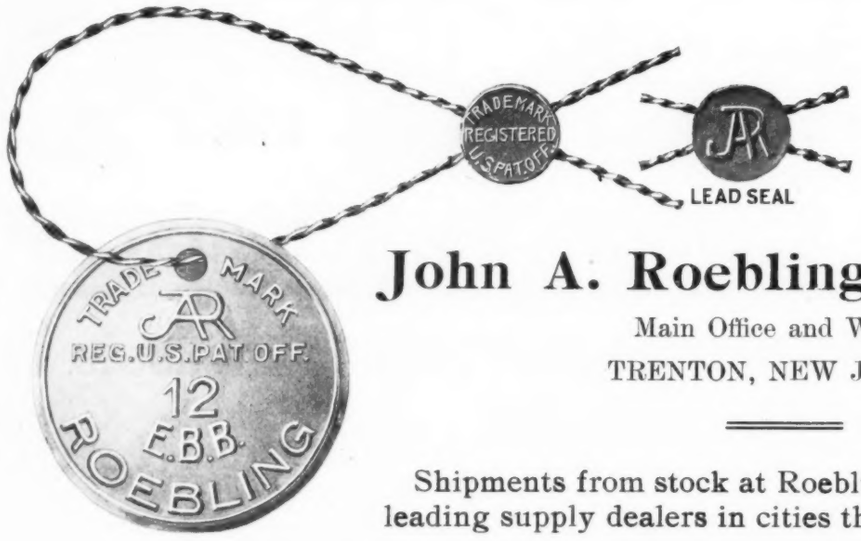
Don't you realize what it means **to your service** and **to you** if your board is built so that your operator has **all the subscribers** within **short** and **easy** reach?

If not, ask your operator what she has to say. Perched on a high and most uncomfortable stool, the strain of the long reach will make her tired and indifferent, and your service will suffer.

You know who will have to answer the complaints.

It certainly is worth your while to investigate and find out how some of your present troubles may be avoided.

ROEBLING DOUBLE GALVANIZED TELEPHONE WIRE



Drawn from carefully selected and tested metals.

Galvanized by processes resulting from an experience of more than 50 years.

John A. Roebling's Sons Co.

Main Office and Works:
TRENTON, NEW JERSEY

Shipments from stock at Roebling warehouses and by leading supply dealers in cities throughout the country.

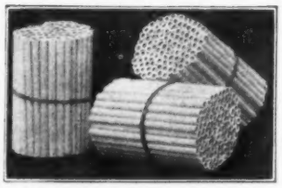
LOOK FOR THE ROEBLING SEAL ON EVERY BUNDLE

Belden Lock-Stitch Twine

A pure flax twine, saturated in beeswax and ready for binding your special keyboard and switchboard cables.

BELDEN PAPER SPLICING SLEEVES

We have a large stock of the best quality. Write for our prices before placing your order.



JUST OUT---BELDEN CATALOG No. 4

100 pages of descriptive matter, cuts and prices of Wire, Cordage and Material used by telephone men; also 25 pages tables, formulas and new data on the design of windings, sent free on application by those engaged in the electrical business.

BELDEN MANUFACTURING COMPANY
194 MICHIGAN STREET, CHICAGO

10,000 Telephone Conversations in a DRY CELL

if they don't leak out on shelf wear. Shelf-wear is all-important to the telephone manager, and in solving this problem he has the co-operation of the

French Battery & Carbon Co.
(Makers of the "Fleur de Lis" Dry Cell)
MADISON, WIS.

We Carry for Immediate Shipment

Capital High Speed Steel	Oil Tempered Wire
Capital High Speed Twist Drills	Music Wire
Eagle & Globe Tool and Die Steel	Tinned Wire
Solar Tool Steel	Cast Steel Binding Wire
Self Hardening Steel	Acme Resistance Wire
Forged Die Blocks	Coppered Bessemer Rods
Spring Steel Sheets	Cold Rolled Shafting
Crucible Cold Rolled Steel	Cold Drawn Screw Rods
Hardened and Tempered Strips	Cold Drawn Shapes
Drill Rods	Cold Drawn Norway Iron
Dental Octagons	Cold Rolled Flat Wire
Roller Bearing Rods	Coiled Springs

Send for Catalogue of Nash Salt Bath Tempering Furnace and our Steel Catalogue

GEO. NASH CO.

New York, 217 Pearl St. Chicago, 115 W. Washington St.
Cold Rolled Drawing and Stamping Steel

American Steel & Wire Company's

W. & M. Telephone Wire

IS made of materials selected and tested in all the stages from our own mines to the finished product. The employment of specially adapted metals is of greater importance in telephone wires, because not alone must tensile strength be considered, but electrical conductivity as well. To attain both these and in addition apply a quality of galvanizing that will effectually protect against weather conditions, is a triumph of the wiremaker's art. It is accomplished only with the greatest facilities for manufacture and an organization trained to the highest standard of excellence. Our brands illustrated below represent the best that experience, skill, facilities and hard and painstaking study can produce.

"ROBERTS" AND WHAT IT MEANS

WHY

Limit Your Party Lines To Four Or Eight Parties on a Line?

WHY NOT

Put Twenty Or Forty Parties On A Line?

PA FORTY TY

Selective Ringing System
Secret Service

PA FORTY TY

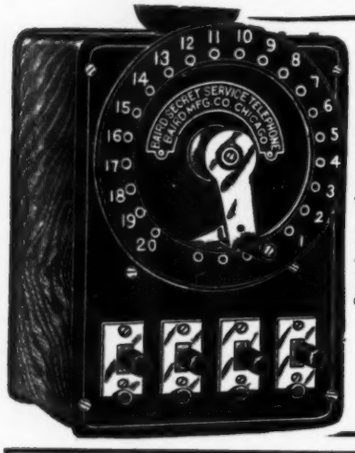
The ONLY LIMIT To The ROBERTS SYSTEM Is The TRAFFIC LIMIT

If YOU Want To Know MORE About The BEST Party Line SYSTEM On The Market

WRITE TO

HOMER ROBERTS TELEPHONE CO., 1703 Melrose St., Chicago

HOMER ROBERTS TELEPHONE CO.
1700 Melrose St. Chicago



Operator's Calling Device

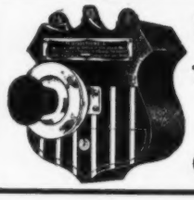
BAIRD PARTY-LINE
SECRET-SERVICE
TELEPHONE SYSTEM

Nineteen or less parties on one magneto line. All "rubbering" prevented. The very best toll service from any telephone without interference or listening in.
Absolutely private service insured to every subscriber.
A long list of delighted customers show approval by many repeat orders.
Every telephone controlled by operator, who can lock in or lock out.

Write for Catalogue and Testimonials.

BAIRD MANUFACTURING CO., 1602 No. Halsted St., CHICAGO

Write for Baird Pay Station Bulletin No. 250.



DO YOU WANT WHAT'S DUE YOU?

THEN INSTALL **GRAY PAY STATIONS** AND YOU'LL GET IT

All details are in Catalog No. 50. Write for a copy.

GRAY TELEPHONE PAY STATION CO., Hartford, Conn.

Insulated Staples

4 Sizes

Pat. Nov. 1900

BLAKE
TUBE FLUX for SOLDERING

Full Size of Tube, 1" x 5"

Patented Feb. 4, '08

COMPRESSED CLEATS FOR USE ON PLASTERING

EXACT SIZE PAT. JULY 1906

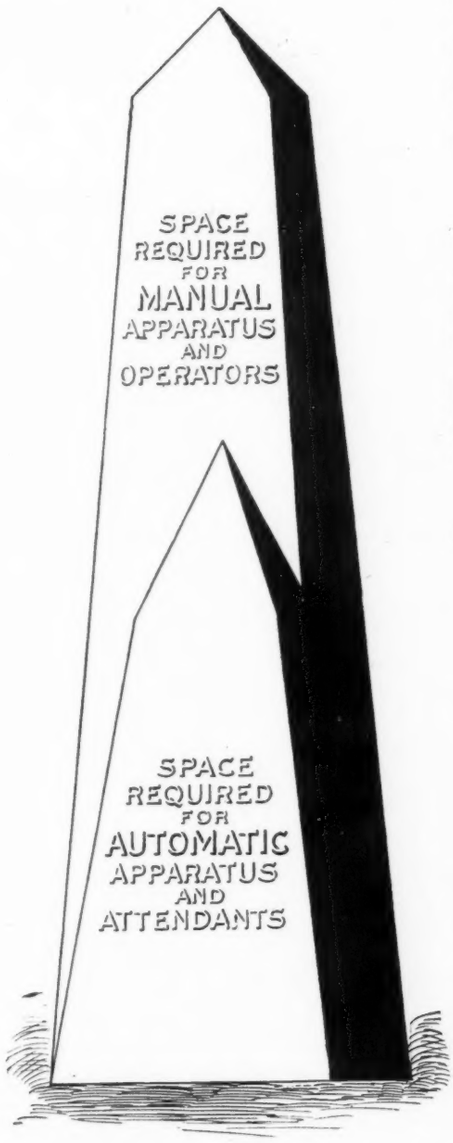
BLAKE SIGNAL & MFG. CO. WRITE FOR SAMPLES 246 SUMMER ST., BOSTON, MASS.

A MONUMENT PAYS NO DIVIDENDS,—

so why erect a large palatial building for housing manual central office equipment when a smaller, cheaper and simpler one will hold automatic telephone equipment of equal capacity.

With automatic telephone equipment you need no operators, and therefore, no wide stairways, no wide halls, no high ceilings, no rest room, no library, no kitchen, no lunch room, no hospital and no locker room.

Our Automatic System has been adopted in the following cities:



Aberdeen, South Dakota.
Akron, Ohio.
Allentown, Pennsylvania.
Auburn, Maine.
Auburn, New York.
Battle Creek, Michigan.
Beaver Falls, Pennsylvania.
Bellingham, Washington.
Berkeley, California.
Billings, Montana.
Butte, Montana.
Cadillac, Michigan.
Champaign, Illinois.
Chicago, Illinois.
Cleburne, Texas.
Columbus, Georgia.
Columbus, Ohio.
Dayton, Ohio.
Decatur, Illinois.
Dowagiac, Michigan.
Edmonton, Alberta, Canada.
El Paso, Texas.
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Princeton, New Jersey.
Richmond, Indiana.
Riverside, California.
Rochester, Pennsylvania.
Rushville, Indiana.
San Diego, California.
San Francisco, California.
Santa Monica, California.
Saskatoon, Sask., Canada.
Sioux City, Iowa.
South Bend, Indiana.
Spokane, Washington.
St. Marys, Ohio.
Strathcona, Alberta, Canada.
Tacoma, Washington.
Toronto Junction, Canada.
Traverse City, Michigan.
Urbana, Illinois.
Van Wert, Ohio.
Wausau, Wisconsin.
Westerly, Rhode Island.
Wilmington, Delaware.

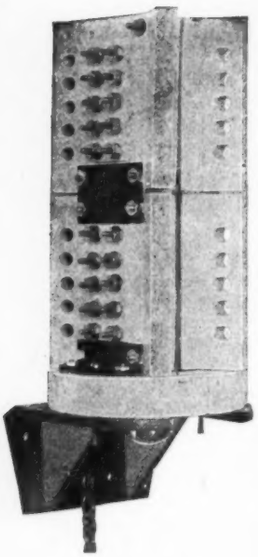
Automatic Electric Company

Van Buren & Morgan Streets

Chicago, U.S.A.

American Porcelain Cable Terminals

(No Pot Head required)



Type "D-P"
Unprotected Terminal

THE AMERICAN TYPE D-P TERMINAL

Is made with porcelain base and sides. The base is split into two halves and the side pieces are fastened to each side of the base by brass angle strips. The terminal is thus made in two halves, each half consisting of a base piece and side. The halves are fastened together with brass bolts, felt being used to make the junctions tight.

A new feature in this American terminal is the building of the sides in "stories." A 10-pair terminal is made one story high, and a 16-pair terminal is made by adding on top of the 10-pair two 6-pair sides, which make it a 16-pair terminal. The illustrations on this circular show the two-story terminals. By adding two additional sides you have a 26-pair terminal. And so on with other sizes.

This design makes it possible to fill all orders for any size very promptly. The sides, being in short lengths, do not warp, are not easily broken in shipment or service, and if any changes or additions are required, nothing is wasted or becomes useless. Our American porcelain terminals are elastic. They can be stretched out from a 10-pair to a 60-pair size or reduced in the same way. This simplifies the carrying of stock and parts. They are the only terminals built on truly economical, common-sense lines.

The type D-P is only a cable terminal. It has no fuses or carbons. It is made in all sizes from 10 to 60 pairs and is fitted with a galvanized iron cover with a long strong chain. It has lock nut binding posts for the jumper wires and solder clips for the cable. The base is malleable iron galvanized, and is fitted with a slot in the front through which the cable is passed so that the terminal may be wired up on the ground and then raised to its place on the pole. The malleable iron base, of course, would be set in proper position on the pole and then the terminal with its attached cable would simply be raised and set upon the base while the securing bolts fastening it to the casting are tightened up.

For wiring, the terminal is opened like a book, each side works on a swivel base, opening as much or as little as desired and swinging back in position when done. A large lead nipple is furnished for fastening cable to terminal.

It is convenient for work, very small in size, light in weight, perfect in insulation and connections, and is sold at a very low price.

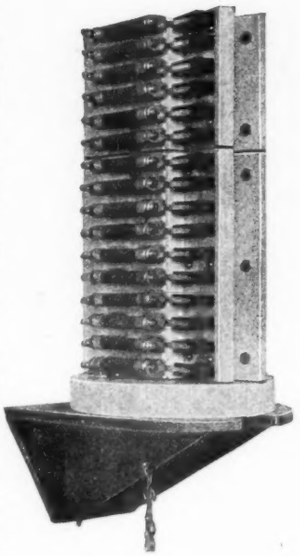
THE TYPE A-P AMERICAN TERMINAL

Is a protected porcelain terminal. It is made up with porcelain fuses and is equipped with carbon lightning arresters.

Like type D-P, the type A-P is made in sectional form, the bases being made of two twin pieces of porcelain, fastened on a galvanized malleable iron base. Upon the porcelain bases the side strips are mounted in sections or "stories," as many pairs as desired, the extra "stories" or sections being securely fastened together with heavy brass strips, which make the entire terminal very rigid and strong.

The type A-P terminal therefore is elastic and can be made of any desired size by simply adding or taking off the extra "stories." It opens like a book for work and is very compact and easy to wire. It is a perfect protector. It has the slotted base casting, so that the terminal can be wired up when on the ground and then raised to its position on the casting, which has previously been fastened to the pole.

American A-P terminal is fitted with American type "V" porcelain three-way fuse, described below, and is an absolutely fireproof protector.



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In other words, he must be not only artist but MECHANIC.

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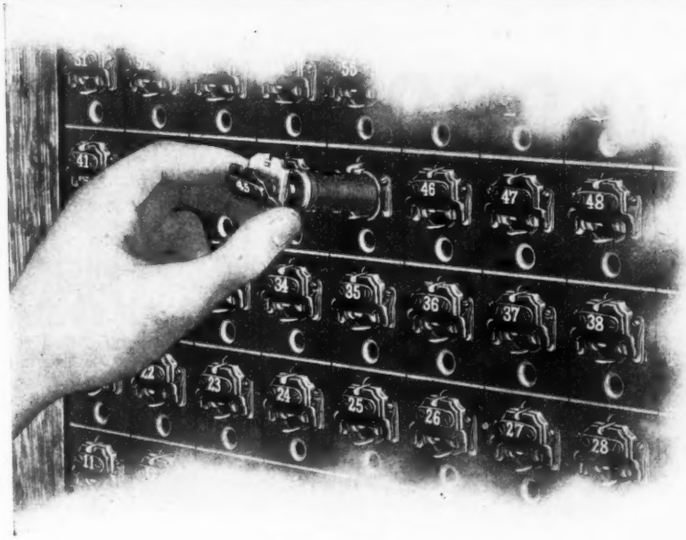
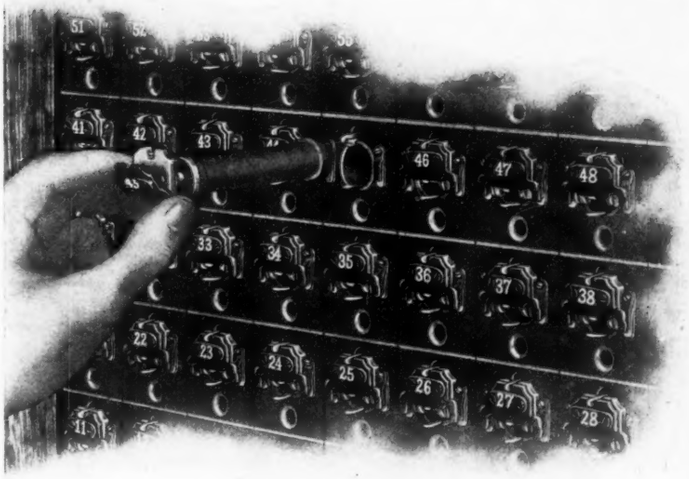


REMOVING COIL

THE illustration to the left shows coil being removed from front of switchboard which can be instantly accomplished by the simple releasing of small spring immediately below drop armature; does not in any way interfere with any other part; can be as quickly replaced in position, and all chances or poor contact or leakage are absolutely eliminated.

THE illustration to the right shows coil removed. This need not necessarily disturb or interfere with service of the subscriber; by inserting plug in corresponding jack subscriber can signal central through clearing out drop; operator can signal subscriber as well with coil out as in. This is an exclusive *Swedish-American feature.* There are other features you should know about. If you are in the market for a new board you will find it to your interest to consult us before placing your order.



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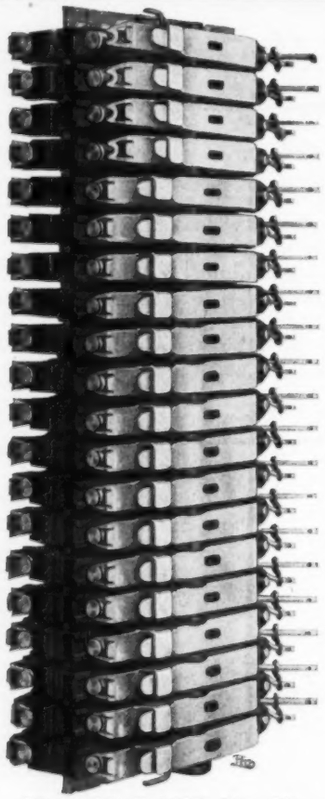

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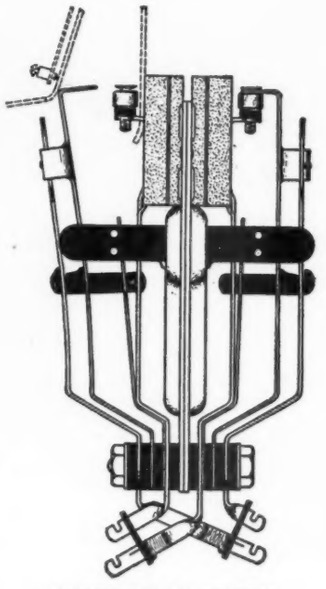

SECTIONAL VIEW

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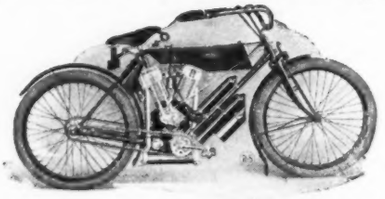

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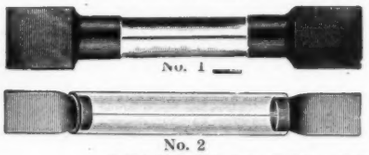

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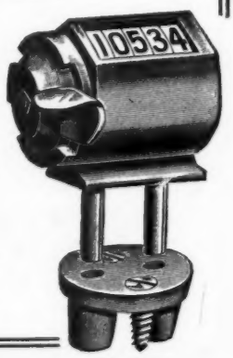

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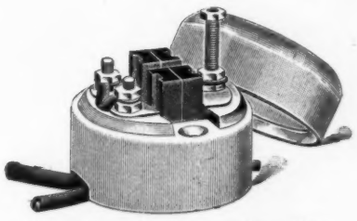
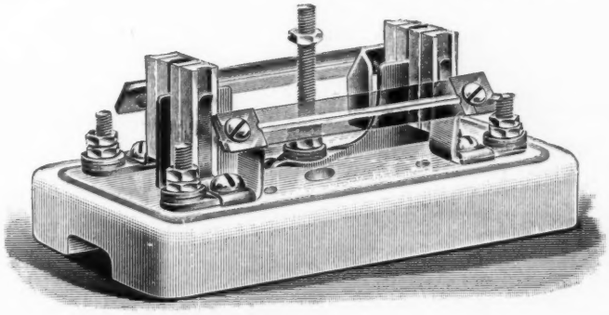
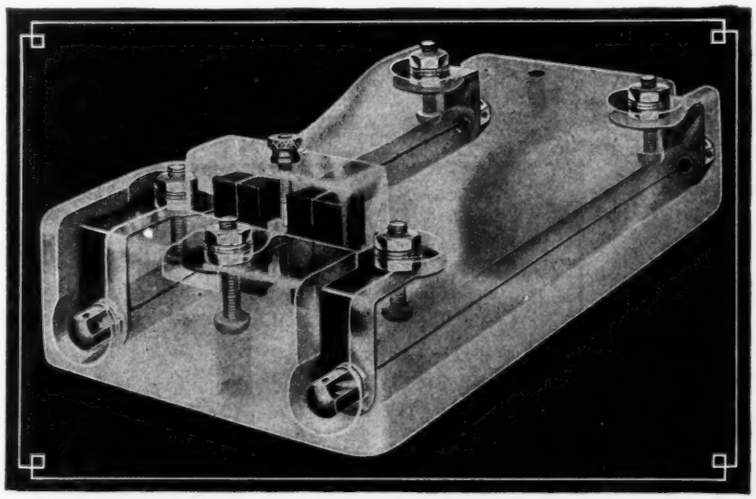


No. 254. Carbons only—Has Porcelain Cover

No. 253. Fuse and Carbon Mounted on Porcelain—Has Glass Cover



No. 252. Ledlie Arrester—Extra Long Fuse and Double Carbon—Has Steel Cover



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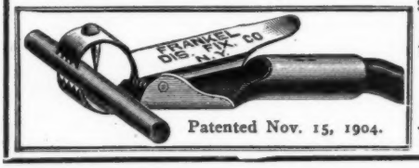

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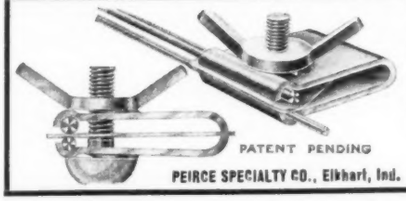

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Telephony.

THE AMERICAN TELEPHONE JOURNAL—

Comprising Telephony, American Telephone Journal, Sound Waves, The Telephone and The Telephone Magazine

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CHICAGO, SATURDAY, SEPTEMBER 5, 1908

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The Cost of Supplying Service to New Subscribers.

In the praiseworthy effort now being made by so many companies to cut down all wasteful expenses of operation it is well not to lose sight of the initial costs of supplying service to new subscribers. There is room for some very good work in the line of procuring rights of way for wiring runs, obtaining pole locations, permits for aerial cable routes, and attachments to existing service leads and residences. It is inevitably essential for more or less routine to surround the supplying of service to a new subscriber, and it is doubtless true that once a man has signed a contract for a telephone, delays in getting it into his house or office only serve to make him want it all the more. Of course, it is a poor plan to fail to push new installations to the best of one's ability, for the quicker the apparatus begins to be used, the sooner comes the time for the next rental payment. The prompt satisfaction of the subscriber is really an asset worth securing, too, and an early connection with the outside world after the contract is signed and approved tends to make a friend rather than a "kicker."

Economy in the use of materials is always aimed for in new work, and the running of cables to provide the shortest possible length of loop between the terminal box and the subscriber's station needs to be done with good planning and intelligent appreciation of the multiplied cost of excessive lengths of open wire in hundreds of new installations. Often several alternative routes will present themselves, and only personal study and figuring on the ground will decide which is the best one, assuming that the services are classified according to private and different sorts of party lines for limited and unlimited service.

It is well to remember that the wages of linemen continue daily whether the new installation is made promptly or with considerable delay. The practice of one company in a recent typical case of new installation illustrates how easily the actual cost of connection may be run upward through delays. The subscriber signed a contract on Aug. 1 for a residence telephone, the house being located within four minutes walk of a large suburban exchange office. The instrument was connected on Aug. 29. During this time the right of way men visited the premises several times, examined the different routes for the service lead to enter the premises, and endeavored to secure the consent of three adjacent or adjoining subscribers to attachment or right of way over their property for a twisted pair lead. Delays ensued through the difficulty encountered in obtaining the best route, and twice the construction force

arrived on the scene ready to install the equipment and had to leave without doing the work. When the final route was settled it was only a matter of a couple of days to connect the instrument.

The lesson of such cases is that the addresses of all parties in interest must be obtained promptly when the order for installation reaches the local office, and if necessary more than one letter requesting rights of way should be mailed to each of the individuals having different addresses. Another point worth looking after is to try to notify new subscribers in advance what day the construction force will be on hand to install the telephone, in order to avoid needless trips to the point where the installation is to be made. In a large company it is very easy to mail a letter asking for a right of way to one address, and then to rest content until a reply comes. Time will be saved in such cases by sparing no reasonable effort to get in touch with the parties whose consent is needed, and in this kind of work, time is costly.

Finally a definite agreement with the city or town as to how residences and business houses may be served by telephone lines is essential to satisfactory results. If the community is unusually strict about the location of even simple bunched aerial pairs through trees, some definite agreement as to what may be done in specific cases is decidedly worth while. If the manager is friendly and reasonable in his relations with the city, it may be possible to convince the authorities that the aerial cable type of construction can do little harm either to the trees or to the appearance of the street. Citizens are entitled to telephone service within a reasonable time, and if the local ordinances are too strict for good practice, efforts can be made to have more practical terms established.

From Our Subscribers.

A friend in Missouri—a real worker and builder of the Independent telephone business—writes: "Your first combined TELEPHONY is a dandy. Keep it up and we will all work for your success." From the northwest another old friend has a good word for the consolidated paper—the weekly TELEPHONY—in which we want to include all the good things that any telephone paper has ever had, and a lot of new ones as well. And he promises more of his able assistance: "I shall continue to write you concerning matters of interest at this end of the continent."

This promise of co-operation is the pleasant and satisfactory thing about most of the letters—they are coming in from the South, and Southwest, and Nebraska, Iowa, New York, Canada—lots of places—which express the gratification of our readers at the change which keeps them in touch with the entire telephone field in one big weekly journal.

Contributions of articles from the men who are doing the real work in the field are coming in, seeking a place in an early issue of the new TELEPHONY. Newspapers, with telephone articles marked, keep us busy reading local happenings—letters give the news of the day in the writer's exchange, county or state. All in all, our subscribers are keeping us going at a lively pace—giving us plenty of work—but in the new TELEPHONY we can pass along all the good things that come to us. And when they do go out—so many of them, and so good—is it any wonder that our readers are pleased with the telephone business, and with the weekly TELEPHONY which represents it?

The Drug Store Pay Station Again.

The New Orleans druggists have reason to congratulate themselves on their solution of the telephone problem. By the simple expedient of getting together and all making the change at once, they have got rid of the free telephone nuisance. They were tired of providing free telephone service to the public, and welcomed the efforts of a telephone man with organizing ability who helped them to get on a better footing. Now they get a commission on every message, and this helps to pay their rent.

Of course the public wants all it can get for nothing; but if it has to pay for what it wants, a reasonable price is no obstacle. There will be just as many necessary messages sent from the pay stations as from the free telephones. Just as many people who go in to telephone will spend money with the druggists. And the telephone company gets paid for every message. New Orleans has set a good example in this.

Our Good Collections.

Distrust of the future has a certain value. It tends to solidify business. And now that we are so rapidly emerging from the period of doubt and lack of confidence, which has affected the entire country for nearly a year, telephone managers find that they have taken advantage of general conditions to make improvements in departments which formerly received insufficient attention.

Until a year ago we were very busy putting on new subscribers, planning conduit and cable leads, getting rights of way, hiring operators and keeping them up to the mark, and looking out for all the other things that go with rapid growth.

Since we have been compelled to look around a bit, growth, which has stopped, or turned backward in other lines, has only slackened in the telephone exchanges. But new plans for getting the office to running smoothly have been worked out, and not only are operating expenses reduced, but business relations with subscribers have improved.

This is notably evident from the reports of collections made by telephone exchanges in all parts of the country. Increased efforts, and more systematic methods of following up delinquents are bringing the desired results. It would seem that telephone subscribers have at last fully learned the lesson of the necessity of making prompt payments for their telephone service—and wherever this is true the manager has cause for self-congratulation.

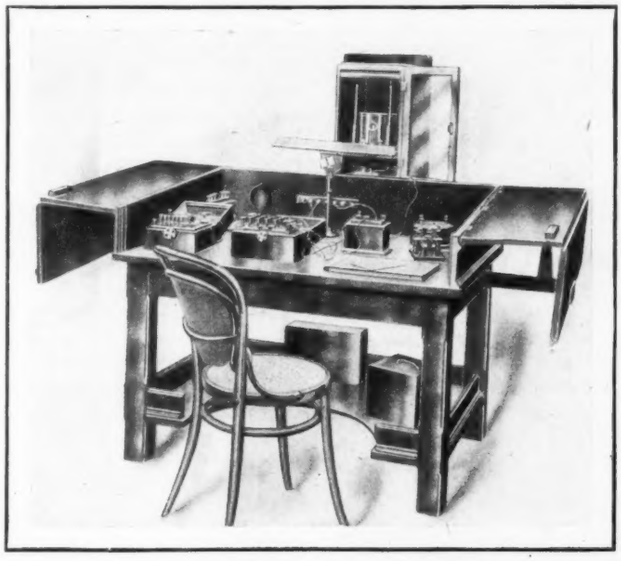
A New Invasion.

Why are the "nature fakers" all getting into the telephone business? In a few days the editor has received reports of a dead crane across wires, bees in a cable box, etc., etc. The last one told of a rattlesnake, coiled around a wire—a loop cross indeed! But the correspondent said "I will not vouch for this." Lost his nerve at the last minute, perhaps.

A Cabinet for Testing Apparatus

By C. A. Smith

In cases where testing apparatus for acceptance measurements on cable and other high grade work is required to be kept under lock and key, and connected up in readiness to make occasional rapid tests, although a special testroom may not be necessary, a substantial, close-shutting cabinet is essential for the proper housing of the delicate instruments. Such a cabinet, as designed by the writer, is shown in the accompanying illustrations. The cabinet when closed is compact, and occupies comparatively little space. The example represented measures 4 ft. long by 3 ft. wide and is 3 ft. 1 in. high at front and 3 ft. 4 in. at the back. It is a massively built table with a lock-up cabinet constructed upon it. It has a sloping top, the object of the slope being to prevent articles being placed upon it.



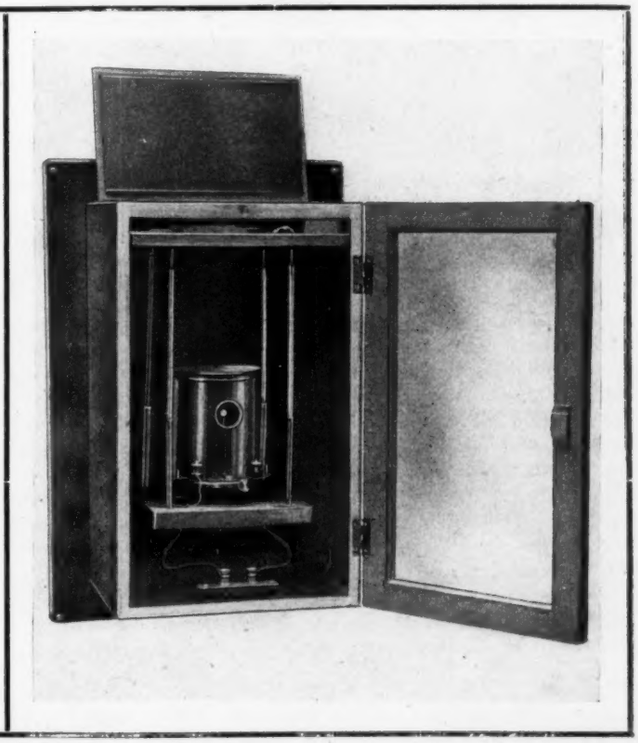
Testing Cabinet, Opened Ready for Use.

When it is desired to open the cabinet, the two sliding arms seen in the illustrations at either side of the table are first drawn out to a convenient distance. Then the two pairs of hinged lids are unlocked at the center, the various bolts withdrawn, and the lids swung over to the right and left until they touch the supporting arms, where they rest. The front panel is then unbolted at both ends and withdrawn to leave the front edge free like an ordinary table. The height of the table is 2 ft. 6 in. The operations of unlocking and opening the cabinet, erecting the scale, switching on the electric light and adjusting the reflecting scale mirror take about half a minute.

The shelf near the floor is to hold the batteries, empty instrument cases, etc., and has a semi-circular front edge to give the operator foot room.

The case in which the galvanometer is suspended has perhaps a novel improvement, i. e., the ready means in which the four suspending rubbers may be adjusted and fixed in position by means of clips or pegs at the top of case. The top hinged lid, shown raised backward, when closed down is secured by a loosely fitting wire nail or pin. Vibrations are prevented from reaching the mirror by connecting a fine wire between the galvanometer terminals and a pair of terminals at the lower front edge of the case.

Closed Cabinet, Completely Protecting Equipment.



Galvanometer Case, In Which Instrument is Readily Accessible.

Long Distance Telephone Exchange Equipment*

General Discussion of a Central Office Installation for Long Distance Telephone and Telegraph Lines

By C. F. Saenger

Several sets of repeaters are used for handling telegraph business on simplexed and composited lines through the exchange. The mounting of these sets is always an interesting problem, as they should be grouped in one place, and so arranged as to be easy of access for observation or adjustment at all times. At the same time the requirements of substantial mounting are not to be overlooked. On account of possible confusion of messages when an attendant is observing the operation of the apparatus, it is desirable to, in some manner, separate each repeater from the instruments working on other lines.

Fig. 35 is a reproduction of a photograph of the repeater tables, showing their general design and construction and the location and arrangement of the instruments as they are mounted. This type of table was designed by the writer, and has been adopted by the company as a standard. It is very substantially constructed of mahogany. The top or base upon which the instruments are mounted is 1¼ inches thick and built of three transverse layers. The two outside layers are of ⅜-inch mahogany, the inside layer of alternate one inch

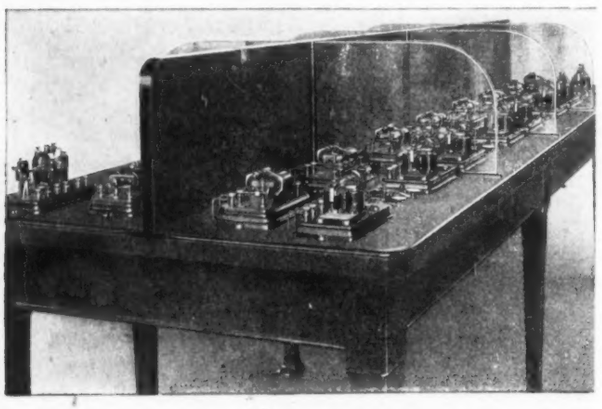


Fig. 35.—Repeater Tables.

square hard pine and butternut blocks. The two sides of the table are divided by a one-inch mahogany partition twelve inches high and running the full length of the table. Upon this partition are mounted double lamp brackets designed especially for this type of table, which are equipped with 16 c. p. 110-volt incandescent lamps, provided with green glass shades, for illuminating the repeater sets. The sets are separated by one-quarter-inch heavy plate glass for the purpose of localizing the sound so that the noise of one set will not prevent the operator from reading the Morse characters of the adjacent set.

Figs. 36 and 37 also show the arrangement of the repeater sets, as they are mounted on the tables, the arrangement of the telegraph apparatus, fuse plugs, etc., and the method of wiring used for the repeater sets and the illuminating circuit. This arrangement carries out the idea of simplicity and accessibility which is also made evident by an examination of the preceding illustration.

Near the table is the storage battery cabinet containing two sets of storage batteries, of sixty cells each, for Morse service. One set is used as a negative and the other as a positive battery; the circuit, however, is so arranged that by means of

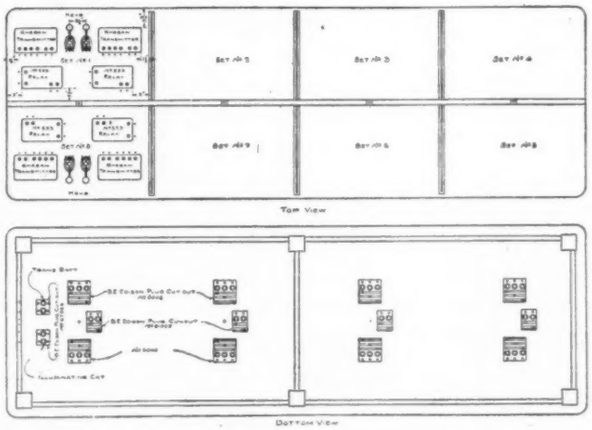


Fig. 36.—Arrangement of Repeaters on Tables.

switches on the power board either set can be changed from a positive to a negative or vice versa, when desired. The sets are divided into three groups of twenty cells each, giving three different potentials, viz., 40, 80 and 120 volts, both positive and negative. The circuit is so arranged that by means of switches on the power board any one of these sets or

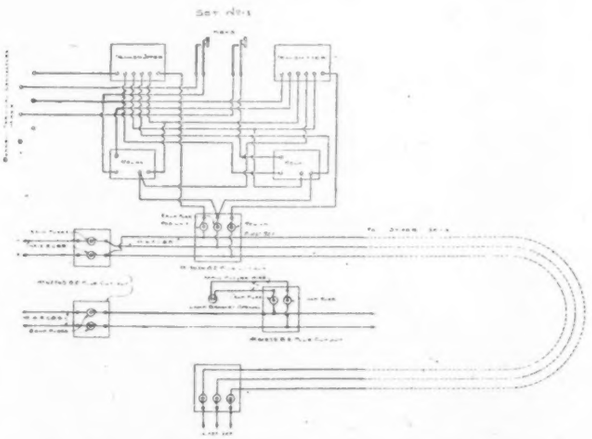


Fig. 37.—Wiring to Repeaters and Illuminating Circuit.

groups, no matter whether discharging as a negative or positive, can be charged individually. Fig. 38 shows the complete circuit arrangement. By this plan all necessary flexibility for meeting the various conditions arising in practical telegraph

*Concluded from the Sept. 5 issue of TELEPHONY.

work are secured. The layout and labeling of the apparatus on the power board which corresponds to this circuit is such as to make it easy for an attendant to perform the necessary manipulations with speed and accuracy.

Fig. 39 is a photograph of the power board, showing its general construction and the arrangement of apparatus. The

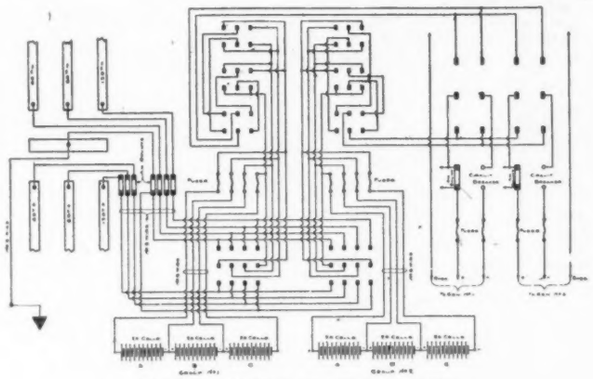


Fig. 38.—Wiring of Repeater Sets.

switches, circuit breakers, starting and charging rheostats, meters and bus bars are mounted on a slate base one and one-quarter inches thick, six feet long and twelve feet wide, divided into four eighteen inch and two thirty-six inch panels. The frame work supporting the slate base is of substantial angle iron construction, joined together with rivets and heavy machine screws and bolts. The arrangement of wiring and bus bars at the rear of the board is of open, neat appearance; all wiring is firmly secured in position, and connections are substantially made. Each of the narrow end panels is illuminated by a single incandescent lamp, and the middle panels each have two lamps, one mounted above each of the measuring instruments.

The power machinery consists of duplicate sets of charging machines. The 2 h. p. motors are operated on a 110-volt direct current primary circuit and coupled to generators having a continuous output of 1.2 kilowatts with a maximum pressure of 180 volts. One one-sixth horse power ringing machine of the same type operates on 48-volt storage battery current primary circuit, the machines having an alternating current output of 80 watts, with a maximum pressure of 75 volts, which is increased to approximately 123 volts through a suitable transformer. One one-sixth horse power ringing machine of the same type, operates on 48-volt storage battery and an alternating current output of 80 watts with a maximum pressure of 34 volts, which is increased to approximately 148 volts through a suitable transformer.

The main distributing frame is equipped with banks of 20-pair iron base tubular fuse and carbon, lightning arresters, designed by the writer and adopted by the company as its standard protector. These banks are mounted on a substantial angle iron frame work.

Fig. 40 is a floor plan of the wire chief's room on the ninth floor and shows the location and arrangement of the equipment. All cables and power wires with the exception of multiple taps and trunks to the chief operator's desk, supervisors' sets and messenger call box, were run on overhead cable racks.

For the toll line and service trunk talking circuits No. 19 B. & S. gage copper conductors with two silk wrappings and one of cotton were used; for all other circuits, with the exception of the power wiring, No. 22 B. & S. gage copper wire with the same insulation, was used. Flame proof cross-connecting wire was used for cross-connections on the main and intermediate racks.

All of the telephone equipment and cabinet work described in the several sections of this article which have appeared in different issues of TELEPHONY was constructed and the entire outfit, with the exception of the composite sets and cabinet, was installed by the Dean Electric Company, of Elyria, Ohio.

Independent Telephones Exclusively Used at De Pere, Wis., in City Offices.

At the last meeting of the city council at De Pere, Wis., it was decided to discontinue the use of the service of the Wisconsin Telephone Co. (Bell). Hereafter telephones of the Valley Telephone Company (Independent) will be used exclusively in the various city offices, including those of the mayor, city clerk, residences of the marshal, deputy marshal and the two street commissioners.

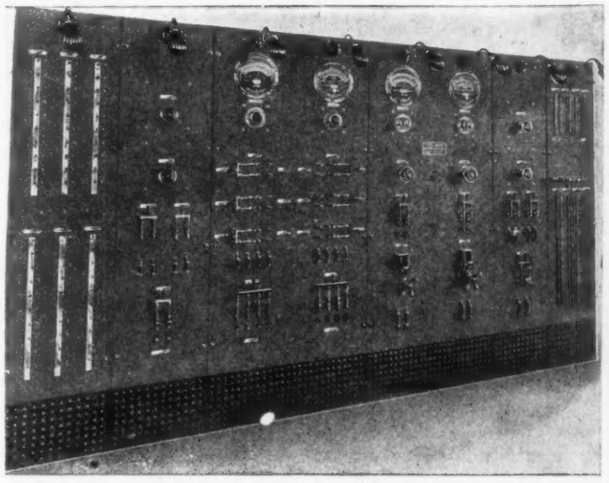


Fig. 39.—Long Distance Power Board.

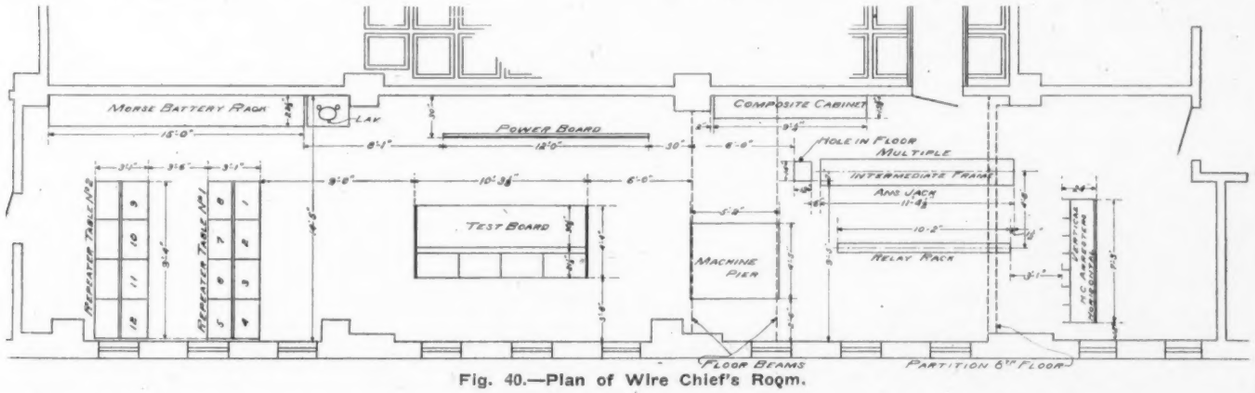


Fig. 40.—Plan of Wire Chief's Room.

The Preservative Treatment of Loblolly Pine Cross-Arms*

By W. F. Sherfesee

Chief, Office of Wood Preservation, U. S. Forest Service.

The character of the timber includes such considerations as the physiological condition of the wood at the different season of the year, whether the timber is composed of heartwood or sapwood, and like questions. These, however, are of practical importance only in so far as they affect the length of the seasoning period. It is interesting to note that timber cut in the fall weighs least, and that cut in the winter is heaviest; that of the spring and summer months occupies an intermediate position. This is true in cross-arms of all three grades, as is shown in Table 3, where corresponding weights for all circumstances appear.

	Weight per cubic foot.			
	Autumn.	Spring.	Summer.	Winter.
Portion of tree.	Pounds.	Pounds.	Pounds.	Pounds.
Heartwood	42.4	42.6	45.1	45.5
Intermediate	48.8	49.9	50.2	51.1
Sapwood	55.6	57.4	57.4	58.2

Table 3.—Green Weight of Loblolly Pine According to Season When Cut.

Far more marked than the seasonal differences of the wood, and of much greater practical importance, are the differences between heartwood and sapwood. It will be seen that sapwood arms cut in the spring weigh nearly 15 pounds more per cubic foot than heartwood arms cut in the same season. The classes differ not only in green weight but in the rate at which the moisture evaporates. This is strikingly shown in Table 4 and Figure 1. These show the behavior of spring-cut arms of all three classes piled in the same way under similar conditions.

At the outset the sap arms had a moisture content of 105.8 per cent, in comparison with 51.5 per cent for the heart arms. In 30 days the moisture content of the sap class had been reduced to 34.8 per cent, a loss of 71 per cent, while the heart arms, whose weight at this time differed from that of the sap arms by only a fraction of a pound, had lost only 18.1 per cent. By the 34th day the arms of all three classes showed the same moisture content. The heart arms had lost practically all the moisture that can be evaporated in seasoning periods of ordinary length, while the sap arms steadily continued to decrease in weight for about six weeks, when the rate of evaporation rapidly declined. The arms of the third class occupied an intermediate position throughout.

The most favorable atmospheric conditions for seasoning

Days seasoned.	Heartwood.			Sapwood.			Intermediate.		
	Weight per arm.	Weight per cubic foot.	Moisture content.	Weight per arm.	Weight per cubic foot.	Moisture content.	Weight per arm.	Weight per cubic foot.	Moisture content.
	Pounds.	*Pounds.*	*Per cent.*	*Pounds.*	*Pounds.*	*Per cent.*	*Pounds.*	*Pounds.*	*Per cent.*
0	38.8	42.6	51.5	52.7	57.9	105.8	45.8	50.3	79.0
30	34.2	37.6	33.4	34.5	37.9	34.8	34.3	37.7	34.0
60	33.9	37.3	32.5	32.6	35.8	27.5	33.8	36.6	30.0
90	34.3	37.3	33.8	32.6	35.8	27.5	33.4	36.7	30.3
120	34.2	37.6	33.7	32.5	35.7	26.9	33.4	36.7	30.3
150	33.9	37.3	32.3	32.1	35.3	25.4	33.0	36.3	29.0
180	33.6	36.9	31.2	31.6	34.7	23.6	32.5	35.7	26.9

Table 4.—Table Showing Percentage of Evaporation.

are high temperature, accompanied by low humidity and sufficient wind to promote a constant circulation of air around the timber. Throughout the greater portion of the United States these conditions are most nearly approached during the summer months, while winter is least favorable for seasoning. Hence timber cut in the spring receives the full benefits of the summer weather, and consequently attains an air-dry condition in less time than that cut in any other season. Under favorable weather conditions, loosely piled cross-arms will often attain an approximately air-dry weight in five or six weeks. Summer-cut timber, which must season in the fall, and timber cut in the winter for spring seasoning, require somewhat longer periods, while the seasoning of the autumn-cut timber, coming as it does in the midst of the winter, is the slowest of all.

MANNER OF PILING.

In addition to natural factors, another of hardly less importance is introduced in the manner of piling the timber.

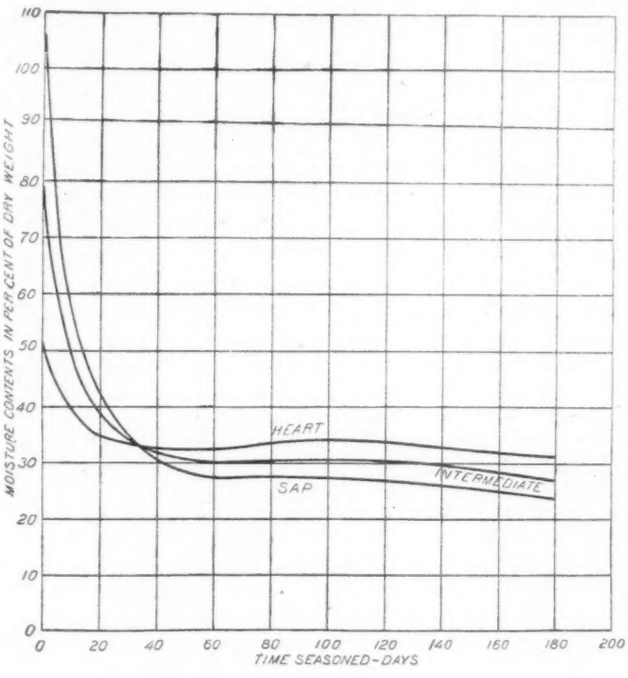


Fig. 1.—Comparative Rates of Seasoning of Cross-Arms Composed of Varying Amounts of Heartwood and Sapwood.

In general commercial practice, economy of space and handling are rightly considered of the first importance, and all other considerations are made subservient. Present practice does not secure the best results, but if there were no means by which these could be attained without the sacrifice of labor and of space economy no change in the present pile forms would be recommended. However, the adoption of proper methods does not appreciably increase either labor or space.

SPACING.

In most seasoning yards the arms are piled closely together, there being about 28 on each tier. (Fig. 2*a*.) In some cases, however, a partial improvement is made by changing the position of either one arm or two arms at the

*Continued from the issue of Sept. 5, 1908.

center and ends of the tiers, as is shown in Fig. 2*b*. Both of these pile forms retard the evaporation of the moisture from the wood. In the closest pile the circulation of air is almost entirely shut off, and all evaporation must take place from the ends of the timbers. In case of heavy rain or melting snow the water trickles down over the timber,

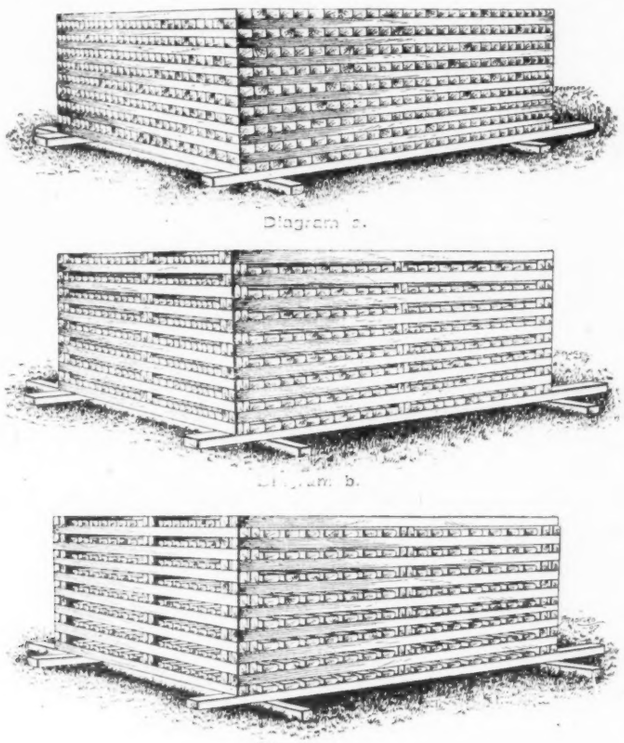


Diagram c.

Fig. 2.—Commercial Methods and Ideal Method of Piling Cross-Arms.

and the dampness thus promoted, together with even moderate temperatures, stimulates the growth of fungi, while the close contact of the timbers permits a rapid spread of infection.

It often happens, therefore, that where timber is so piled the growth of wood-destroying fungi has reached a serious stage before the timber itself has attained its air-dry condition; hence it is not uncommon to hear the assertion that the sapwood of loblolly pine will rot before it can become air-dry. Such an assertion is probably untrue in every case; and it is certain that loblolly, or any other timber, in a form so well adapted for rapid evaporation of moisture as cross-arms, can be fully seasoned in any part of the country without risk of deterioration during the seasoning period. By adopting the pile form shown in Fig. 2*b* a circulation of air is permitted along the sides of the arms. The upper and lower faces are still so closely crowded together that no air currents can pass between them. Obviously, the next step is to separate the arms from each other by a space of sufficient size to insure a thorough circulation of the air on all sides of the arms, and yet not so large as to consume unnecessary space. When these two requirements are met, the ideal form of pile is attained.

Many experiments have shown that if from 20 to 22 arms are allowed to each tier, and arranged as shown in Fig. 2*c*, most of the desired results will be attained. This pile called for convenience the 20 by 20 form, compared with those in general use, gives a surprising difference in the rate of seasoning, as shown in Fig. 3. For example, sap arms of the July allotment were piled as in Figs. 2*c* and 2*b*. Those in the 20 by 20 pile dried out to a weight of 34.1 lbs. per arm in a little more than six weeks, while more than 16 weeks elapsed before a like weight was reached by the arms in the Fig. 2*b* or 28 by 28 pile. The only difference in the two piles was in the number of arms to the tier. Had the arms in the 28 by 28 pile been packed closely together, as in Fig. 2*a*, the difference in the rate of seasoning would have been much greater, as will be evident from a common-sense consideration of the points mentioned.

ROOFING.

Under climatic conditions such as prevail in most parts of the United States throughout the greater portion of the year it is best to expose the timber directly to the sun and rain. During the winter months, however, or whenever there is a prevalence of rain or snow, excellent results will be secured by piling the arms under a roof, without walls, or by constructing a rude roof over each pile. This latter method will probably be the cheapest, as it avoids the difficulty of handling the arms in a confined space. If the boards are placed as shown in Fig. 4*a*, the arms below will remain dry during even a heavy rain or snow storm. Of the two, snow is the more serious, since it generally takes longer to evaporate; and during its slow melting the partially seasoned timber will absorb moisture without giving it off. In all cases the roofing should extend out over the pile on all sides to protect the ends of the arms, for it is there that the evaporation or absorption of moisture is

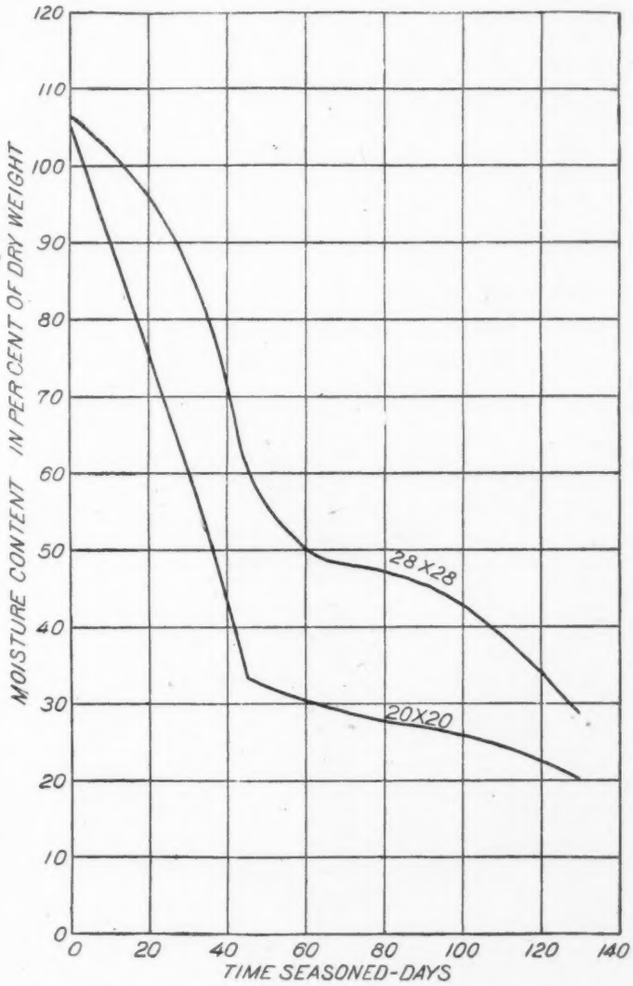


Fig. 3.—Rates of Seasoning of Cross-Arms Piled by Ordinary Method and by Ideal Method.

most rapid. The effect of a roof over the piles during a rainy period is strikingly shown in the curves in Fig. 5.

During the winter the difference between the moisture content of the roofed and unroofed piles became constantly greater; it was not until spring that the two curves began to converge.

It is not advisable to attempt to form the roof with the arms themselves, as shown in Fig. 4*b*, for three reasons: In the first place, the roof is too short and too narrow to give proper protection to the ends and sides of the pile; in the second place, the exposure of the roof arms to maximum changes of atmospheric condition causes severe checking and warping, with a consequent loss of timber; and, in the third place, considerably more labor is required to handle the greater number of pieces necessary in constructing the roof.

IMMERSION IN WATER.

Exhaustive experiments were made on the effect of water soaking before seasoning. It was found that there was little to be gained by immersion for different periods up to thirty days. The general results are shown in Fig. 6.

However, it should be remembered that in these experiments the longest period of immersion was one month, since it was not believed that the beneficial effect of soaking could be such as to warrant longer immersion. Had the arms been soaked for several months it is possible that wholly different results would have been obtained. So far as the present purpose is concerned, however, such results would have been of little practical value.

It may therefore be concluded that immersion before seasoning is not justified if it involves additional time and expense. The beneficial effects on subsequent seasoning, except, possibly, where the soaking is continued for prolonger periods, are slight; and soaked arms do not appreciably surpass unsoaked ones in the absorption of preservative.

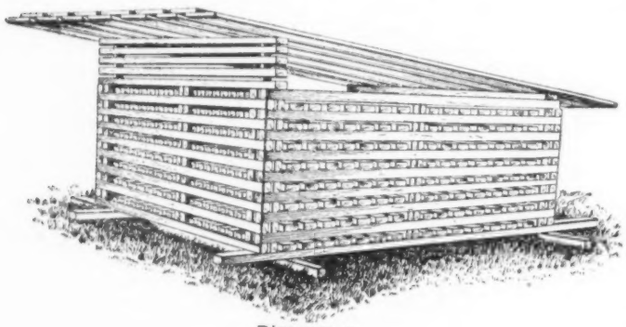


Diagram a.

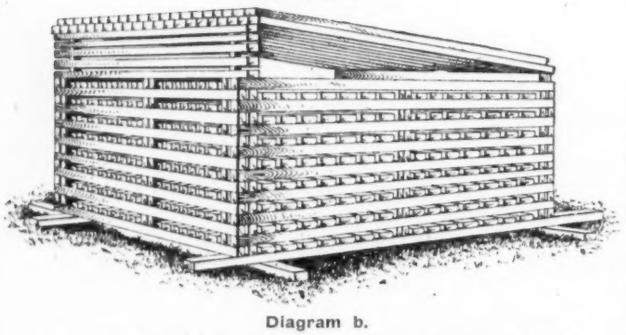


Diagram b.

Fig. 4.—Proper and Improper Methods of Roofing Piled Cross-Arms.

SHRINKING, CHECKING, AND WARPING.

Shrinking, checking, and warping, which commonly take place during the seasoning of timber, are due to variations in the moisture content of the wood. A cubic foot of green sapwood of loblolly pine, weighing about 60 pounds, contains approximately 32 pounds of water. In the seasoning of the timber to an air-day condition, to a weight of, say, 34.5 pounds per cubic foot, about 25.5 pounds of water are evaporated. This great change in the moisture content manifests itself by reducing the bulk of the timber. Generally this is accompanied by more or less checking and warping.

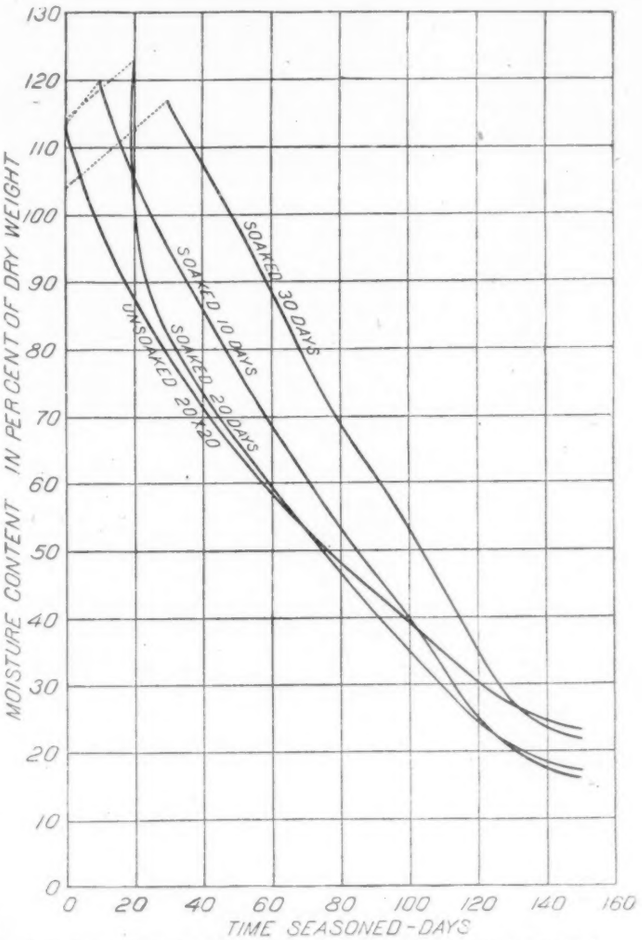


Fig. 6.—Curves Showing Seasoning of Soaked and Unsoaked Cross-Arms.

THEIR EFFECTS ON INSULATOR-PIN HOLES.

In Bulletin 70 of the Forest Service it is explained that water may exist in wood in two states, either as imbibed moisture, which is absorbed by the cell walls, or as free water, which merely fills the pores or cavities of the wood like honey in a comb. In wet and in green wood the water exists in both conditions. In the process of seasoning the free water is evaporated before the amount of moisture in the cell walls is reduced, and as its evaporation brings about no change in the substance of the wood, no shrinkage or other effect takes place. According to one theory the cell walls are made up of exceedingly minute particles of material called mycellae, which are invisible even by the aid of a microscope. When comparatively dry wood is subjected to moisture the water readily passes into these mycellae and forces the particles farther apart, causing a consequent increase in the bulk of the wood. Similarly, when the evaporation of the free water is complete, the moisture begins to be drawn from the cell walls, the particles are drawn together, and shrinkage takes place.

To determine whether the shrinkage in the cross-arms

during air seasoning is sufficient to reduce appreciably the diameter of the holes for the insulator pins, measurements were made on several hundred arms of the heart, sap, and intermediate classes. It was found that for all practical purposes this shrinkage can be disregarded.

The objection to air seasoning is sometimes made that,

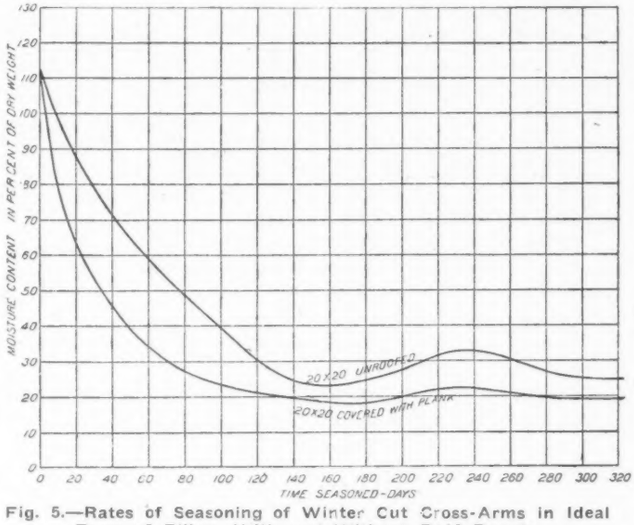


Fig. 5.—Rates of Seasoning of Winter Cut Cross-Arms in Ideal Form of Piling, With and Without Roof Boards.

although the area of the holes is not materially reduced, the shape is so distorted as to prevent the ready entrance of the pin. Theoretically, there is some basis for this fear, as shrinkage across the grain is much greater than longitudinally, and hence there might be a tendency for the holes to assume an elliptical shape. Observation, however, failed to show that this possibility need be considered.

The object of the experiments in the treatment of the cross-arms was to devise a process which would insure a uniform, efficient, and cheap impregnation. The preliminary work had shown that under the system in common use the sap-wood portions of the arms received an excess of oil; this not only added to the cost of treatment but proved an actual detriment, because the oil exuded in warm weather and dripped upon passers-by. On the other hand, the heartwood portions of the arms received a merely superficial penetration. It is true that heartwood is naturally more durable than sapwood, yet this natural durability is by no means equal to that of sapwood thoroughly impregnated with a good preservative. This is especially true in such species as loblolly pine, because the heartwood is by no means durable. As the surface of most of the arms is composed of both heartwood and sapwood, it is apparent that both classes of wood should be thoroughly preserved. The decay of the heartwood portion, no matter how small, in most cases renders the entire arm unfit for service.

In the preliminary treatments it was shown that the preservation is absorbed much more readily into the sapwood portions than into the heartwood, and that the application of pressure is necessary to force the preservative into the more impervious heartwood. This pressure may be applied by force pumps, as in the closed-cylinder processes, or by the atmosphere, as in the open-tank method. In either case the sapwood is thoroughly saturated with the preservative before the heartwood has received more than a superficial painting. In order to obtain a uniform penetration, without excess of oil, it is necessary to continue the pressure until the heartwood has received the desired penetration, and then to extract and recover the superfluous oil from the treated wood. The finding of a method to do this constituted the principal object of the experiments. The first series of experiments was undertaken to secure the desired penetration. The extraction of the superfluous oil constituted the object of the latter tests.

(To be concluded.)

History of the Automatic Telephone*

By Arthur Bessey Smith,

Assistant Professor in Telephone Engineering, Purdue University.

The preliminary contracts of January, 1897, between the Strowger Automatic Telephone Exchange and the Automatic Telephone Exchange Company were followed by another contract signed Aug. 10, 1897. The former company now devoted itself more actively than ever to development, and during the fall of 1897 and spring of 1898 made up a number of exhibit boards which could be used to demonstrate the system and get business. One of these was equipped with a number of trunks between groups, the selection of the non-busy trunk being made by the "0" scheme which has been described. Another way of securing this selection had been considered, and rejected as not practical. It was to have the interrupted battery current furnished by a machine at central, instead of doing it by the extra motion of the dial. But because of the necessity which this would impose of running the interrupter machine all the time, it was considered impractical. One of the exhibited boards had the magnets bridged.

January 27, 1898, another contract was signed between the Strowger company and the Automatic Telephone Exchange Company, relating to manufacturing by the former and the operation of exchanges by the latter.

March 12, 1898, Mr. A. E. Keith started on a trip to Europe in connection with foreign royalties. He took with him some exhibit boards and showed their operation in London.

In June, 1898, a 400 line board was installed at Amsterdam, N. Y., replacing the 200 line board which had been installed in May, 1896.

As a beginning of its operating projects, the Automatic Telephone Exchange Company, of Washington, D. C., sublet part of its United States territory. October 8, 1898, a contract was given to the New England Automatic Telephone Company for operating the Strowger system in New England. December 16, a similar contract was given to the Pacific Automatic Exchange Company.

November and December, 1898, were occupied by the Strowger company in redesigning the 1000 line system. The side switch, that most important adjunct to the modern selector and connector, was invented at this time. It was the outgrowth of the need for collecting the several auxiliary operations into one compact group, controlled with certainty by a single magnet. Its beginnings we have already seen.

Another important change was the switching of both line wires instead of one as formerly. The motor magnets (vertical and rotary) were still in line, but were bridged, so that the talking circuit was perfectly balanced. Relays were

*Continued from the *American Telephone Journal*, issue of Aug. 29.

used in disconnecting. The bank was divided into three parts, 100 contacts for the private, 100 for the vertical lines, and 100 for the rotary lines. As many of these features will appear in the New Bedford board, they will not be further described here.

In settlement of some difficulties which had arisen between the two companies, another contract was signed January 1, 1899.

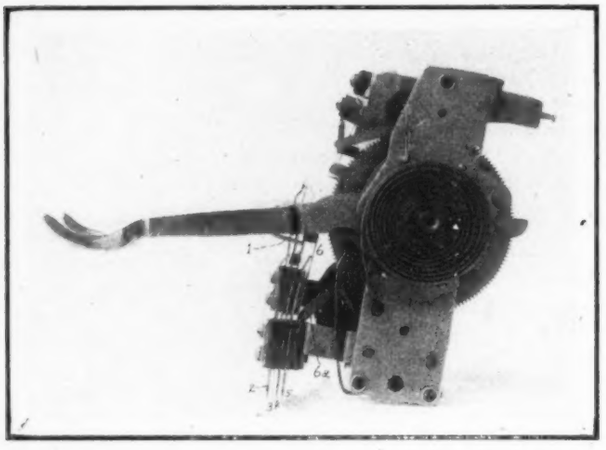


Fig. 54.—Front View of Sender with Hook Down as if Receiver Were On It.

In this contract the question of royalties was adjusted. But the two companies seemed not to be able to do business with mutual satisfaction, for the Washington company brought action in court against the Strowger company. The suit of the Washington company was settled out of court by agreements signed June 9, 1899, by which the Automatic Telephone Exchange Company was to run the entire business, including manufacturing. The Strowger company agreed to turn over all business and correspondence to the Washington company and gave it an option on the foreign patents, but retained the right to use automatic switches in Cook county, Ill. The Automatic Telephone Exchange Company dismissed its suit, and assumed liability for the Strowger lawsuit.

In accordance with the above, on June 21, 1899, the Washington company took charge of the factory at Chicago.

The Strowger company having secured a contract for a board to be used in Berlin, Germany, spent the summer of 1899 building a 400 line board to fill the order. In August and September the board was shipped. It had automatic trunking by the "0" scheme. In October Mr. E. A. Mellinger and R. R. Landon started the installation of the board, which was cut into service in May, 1909. This board served till 1903, when it was replaced by a larger board of a later type.

In October, 1899, Mr. B. G. Dunham, who had been at Augusta, Ga., with the automatic plant of the Augusta Telephone & Electric Company, began work for the Automatic Telephone Exchange Company.

The engineers of the Strowger company continued to work on the problem of the automatic selection of non-busy trunks, which was then the great necessity. In November, 1899, they produced a successful selector with a machine rotary, so that it was not necessary to insert the "0" in the number. A small exchange was built, and operated in the office of the company in November, 1899.

December 17, 1899, the Automatic Telephone Exchange Company moved the factory to Baltimore, Md., having found that it was not possible to work at a distance with any satisfaction. But in the end the Washington company gave up the struggle, and sold everything back to the Strowger company. This took place June 6 and 9, 1900. The factory was moved back to Chicago on June 30.

In the time that the Automatic Telephone Exchange Company had been doing business it had installed interior exchanges at Washington, D. C. in the White House, the Coast and Geodetic Survey, the Times Building, and the Bliss Building, and also at Yuma, Ariz. In December, 1900, the company failed and went into the hands of a receiver.

In the year 1900 the Strowger company began making its own improved transmitters.

Mr. B. G. Dunham, who had been transferred from the Washington company at the time of the final settlement, left the latter company in the last part of August, 1900, to take a position in the automatic plant at Augusta, Ga.

The year 1900 is marked by the production of the switchboard for New Bedford, Mass., which embodied for the first time in a public exchange the principle of automatic trunking. It had a 10,000-line ultimate capacity, and employed first selectors, second selectors, and connectors. There were, however, only four thousands installed, each having 900 lines.

The substation sender is shown in Figs. 54, 55, and 56. Figure 54 is a front view, with the lever down as if the receiver were on the hook. The dial proper has been removed, but the cone on which it fits may be seen at the center of the spiral spring. The springs of the hookswitch are 2, 3, 4, 5 and 6. The piece 1, making contact with 4, is insulated from the exposed portion of the hook, but connected electrically to the frame. The piece 6a, connected to 6, extends toward the dial shaft, so that in its normal position a pin on the dial tooth wheel rests against it.

Figure 55 shows the rear of the sender, with the hook up; 12, 13 and 14 are the release springs; 15 is the detent for the star-wheel, *S. W.*, and 16 is the pin on the hook lever which operates the release of both star-wheel and springs. Just at the left of the release springs a portion of the governor is visible.

The reverser, 29 and 30, is made of two disks mounted on the dial shaft, but insulated from it and from each other. Each has half its rim cut away so that, in the position of rest, spring 28 rests on 29, and 27 on 30. But when the dial is turned by the act of pulling a digit, the two spring contacts are reversed, 28 resting on the edge of 30, and 27 on 29. Spring 31 makes contact with disk 29 at all times. There is

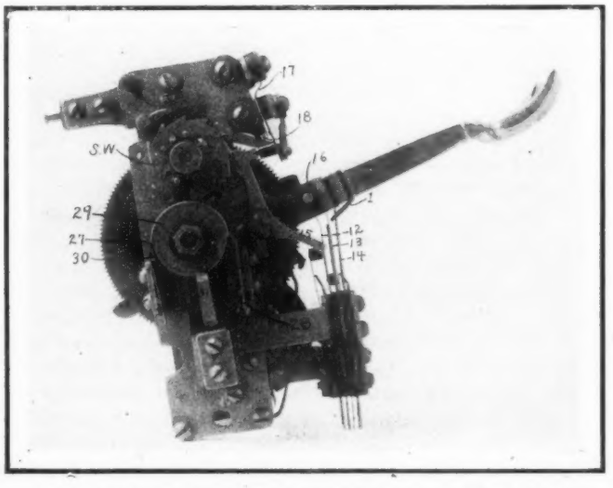


Fig. 55.—Rear View of Sender with Receiver Off of Hook.

a spring, 32, which makes constant contact with disk 30, but as photographed it is hidden by spring 31.

Figure 56 shows the mechanism in the act of pulling the first digit. The arm carrying the pawl, *P*, is rigidly attached to the dial shaft. The pawl acts on the star-wheel, *S. W.*, moving it one notch for each pull. The reverser is shown in action.

The ground is wired to spring 17. When the hook is down and before the first digit is pulled (Fig. 56), the detent 15 rests on a tooth of the star-wheel, *S. W.*, as shown. The insulated head of 15 presses the ground spring, 17, away from the contact, 18, the latter being the common ground connection for all the instrument wiring. But on pulling the first digit (Fig. 56) the detent falls, allowing the ground spring to touch contact 18.

The complete wiring of the substation is shown in Fig. 57, all parts being numbered to correspond to the three preceding illustrations. The talking set consists of a local battery primary circuit, with transmitter, battery, and primary of induction coil wired to springs 2 and 3 of the hook, and the secondary circuit, composed of the receiver and the secondary of the induction coil, wired from the rotary line to spring 7 of the ringing key. This is normally in contact with spring 8, which goes to spring 5 of the hook. The bell is connected from the rotary line to spring 4 of the hook, which normally connects through contact 1 to the frame, returning through pin 24, spring 26, spring 28, disk 29, spring 31, to vertical line. The rotary line is thus the common terminal for the bell and receiver circuits, while the vertical line is switched from bell to receiver by the hook.

In making a call, the receiver is taken from the hook, switching the bell out and the receiver into circuit. The receiver has its circuit completed to the vertical line over the following path: 7, 8, 5, 6, 6a, dial, frame, star-wheel, 24, 26, 28, 29, 31, to vertical line. When the dial is rotated on the first digit, contact 6a is broken, disconnecting the vertical and rotary lines from each other. The spring, 19, of the dial tooth wheel does not make contact on this motion. As the reverser, 29, is on the dial shaft, it also moves to the left the same angular amount. At the same time pawl *P* (Fig. 55 and 56) 57) drop into a notch, grounding 18, also removing pin 24 from 58) drop into a notch, grounding 18, also removing pin 24 from spring 26 and causing pin 21 to touch spring 25. Now, as the dial clicks its way back, opposite to the arrow, spring 19 makes a series of contacts grounding the vertical line over the path from dial to frame, *S. W.*, 21, 25, 27, 29, 31, to vertical line. Just before the last impulse, the reverser, 29, changes connection so as to bring the impulse to the rotary line.

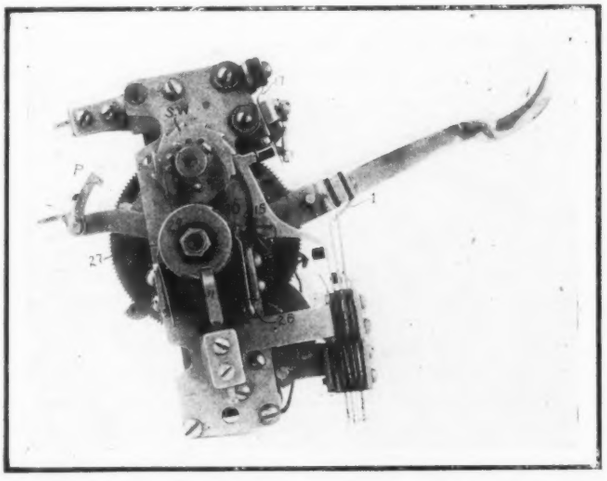


Fig. 56.—Mechanism of Sender as First Digit Is Pulled.

The second and third digits are pulled in the same way, the impulses coming over pins 22 and 23, respectively, of the star-wheel, since each pull of the dial rotates the star-wheel on notch. When pulling the fourth digit, the star-wheel is pulled so that pin 23 is cleared from spring 25 and pin 20 is made to rest under spring 26. This makes the series of impulses go in over the rotary line, ending up with a single impulse on the vertical. The reason for this will be made evident in connection with a discussion of the switches at central.

To ring, the ringing key is pressed. This connects the bell across the line and grounds its center through 2000 ohms, cutting out the receiver while so doing.

To release, the receiver is simply hung on the hook, causing

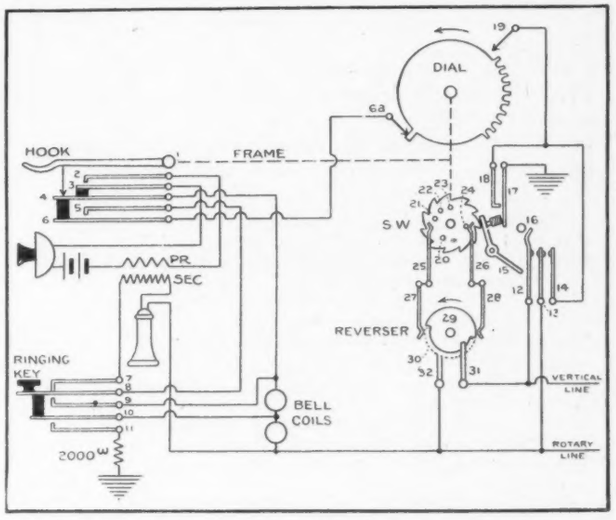


Fig. 57.—Complete Wiring Diagram of Subscriber's Set.

pin 16 to move downward. This momentarily closes together all three springs, 12, 13, and 14, short-circuiting and grounding both vertical and rotary lines. Pin 16 also presses detent 15 away from the star-wheel, *S. W.*, allowing it to snap back to its original position by the force of a spring, 17, off contact 18, thereby freeing the apparatus from ground.

To sum it up in a few words, the functions of the sending device are as follows:

1. Switch the talking and ringing circuits as in any local battery telephone.

2. On operating the dial, disconnect the receiver circuit and ground the lines according to the following code:

First digit,	V. Line — — — — — — — — —	R. Line —
Second digit,	V. Line — — — — — — —	R. Line —
Third digit,	V. Line — — — — — — — —	R. Line —
Fourth digit,	R. Line — — — — —	V. Line —

3. Ring by connecting the bell across the line instead of the receiver, and ground the center of its windings through 2000 ohms.

Release by dead grounding both vertical and rotary lines momentarily, and resetting the star-wheel.

(To be continued.)

Heroic Death of Operator in New Mexico.

During a big flood at Folsom, N. M., in which between 20 and 30 lives were lost, on Aug. 28, Mrs. S. J. Rooke, a telephone operator, went to her death a heroine. In the face of certain death she remained at her post in the doomed telephone building until she had sent an alarm to every home connected to her exchange, and until every avenue of escape for herself was cut off. Many owe their lives to the brave woman.

Oklahoma Requires Installation of Public Telephones in Stations.

The Oklahoma Corporation Commission on Aug. 25 decided that a public telephone at every railroad depot in a town where there is a local telephone exchange is a public necessity, and issued an order requiring such telephones to be maintained for the use of the public at the expense of the railroad companies.

Comparative Costs of Brick and Concrete Manholes

By Clarence Mayer

Table 2 gives the average material and labor cost of concrete manholes, the design and dimensions of which were the same as that shown by Fig. 1, except that the walls were six inches thick instead of nine inches, as in brick manholes. The walls of these manholes were built with the sectional wood

Quantities and Cost of Material:	
.4814 yard conerete for bottom at $3.98	$ 1.92
.8368 yard concrete for sides and top at $4.29	7.55
1 frame and cover	11.74
Total material cost per manhole	$21.21
Cost of unloading and distributing material	.57
Labor Cost:	
Cost of teaming	2.56
Cost of excavating	4.36
Cost of mixing and placing concrete for bottom	.89
Cost of mixing and placing concrete for sides	4.79
Cost of placing frame, and mixing and placing concrete for top	2.98
Cost of supervision	2.11
Total labor cost per manhole	$17.69
Total cost per manhole	$39.47

Table 2.—Average Material and Labor Cost of a Concrete Manhole, Based on Cost of Building 29 Manholes in Clay Soil with Forms, Figs. 2 and 3.

forms shown by Figs. 2 and 3. It will be seen that these forms are made in four sections—two side sections and two end sections; both side and end sections are fitted with grooved iron ends. For convenience in handling, these forms are made one-half the height of the manhole wall, so that two forms are required in building the wall to the height shown on Fig. 1. In using these forms, it is necessary to put braces between the two side sections; standard ditch braces are used for this purpose. The method and forms used for forming openings* for the entrance of ducts are shown by Figs. 7 and 8. These forms are made in two styles, collar and block. The collar form is used where ducts are already installed and the block

Quantities and Cost of Material:	
.4814 yard concrete for bottom at $3.98	$ 1.92
.8368 yard concrete for sides and top at $4.29	7.55
1 frame and cover	11.74
Total material cost per manhole	$21.21
Cost of unloading and distributing material	.60
Labor Cost:	
Cost of teaming	2.45
Cost of excavating	4.30
Cost of mixing and placing concrete for bottom	.86
Cost of mixing and placing concrete for sides	2.60
Cost of placing frame, and mixing and placing concrete for top	2.84
Cost of supervision	1.73
Total labor cost per manhole	$14.78
Total cost per manhole	$36.59

Table 3.—Average Material and Labor Cost of a Concrete Manhole, Based on Cost of Building 31 Manholes in Clay Soil with Forms, Figs. 11 to 14, Inclusive.

form is used where it is desired to leave an opening for the entrance of future ducts. The collar form is placed just over the ducts and against the forms used in building the manhole wall, and is removed after the wall form has been removed. The block form is placed against the center of the side or end walls, as the case may be, and is removed upon removal of the forms used in building the wall. In the case of sewer tile, openings for their entrance are made with the forms shown by

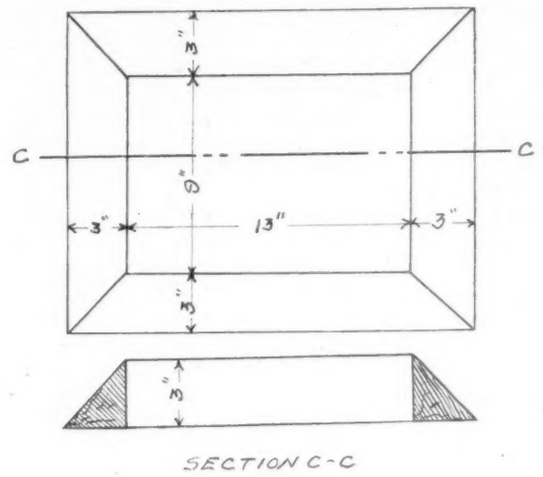


Fig. 7.—Form Used for Tile Conduit Openings in Manhole.

Figs. 9 and 10, in a similar manner to that described for forming openings for the entrance of ducts. Usually, no beveled openings are made for sewer tile; they are embedded in the wall of the manhole with the bell end set flush with the inside wall. It is, however, sometimes desirable to have beveled openings where the sewer tile is designed for carrying lateral cable of large diameter.

Table 3 gives the average material and labor cost of concrete manholes, the design and dimensions of which are sim-

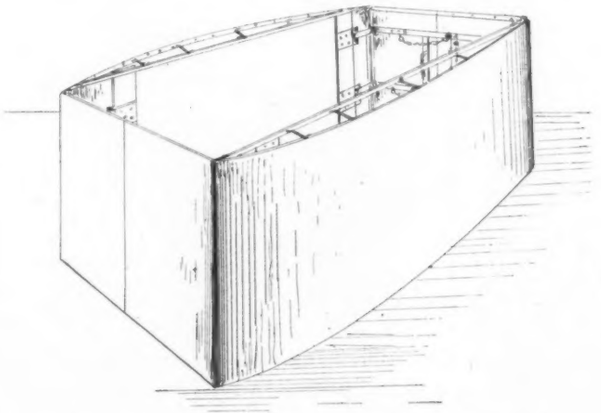


Fig. 8.—Collapsible Steel Form for Concrete Manholes.

ilar to those last explained. The collapsible steel forms shown by Figs. 11 to 14, inclusive, were used in building the walls of these manholes. It will be seen that the cost of these manholes was considerably lower than the cost of the manholes given in Table 2. This lower cost is accounted for by

*Concluded from issue of Sept. 5, 1908.

the use of the steel forms, which are much cheaper to set up and remove than the form used in building the manholes of Table 2. This form is made in two parts, each part forming one side wall and one-half of each end wall. The end pieces of one of the two parts are fitted with overlapping steel bands which are fastened as shown by Fig. 13, and hold the form rigid, so that the use of braces is not required. The end pieces are hinged well back on the side pieces so that they swing inward immediately and do not scrape or catch against the concrete upon removing the form. Two of the forms are used in building a manhole to the height shown in Fig. 1.

The data given in these tables, based as they are on the work of one gang and practically the same kind of soil and conditions, leave no grounds for doubt as to the advantage of concrete manholes over brick manholes from a standpoint of low cost; and as to the question of durability, the superiority of concrete over brick is universally admitted.

Other advantages of installing concrete manholes are that there is no waiting on bricklayers, and concrete manholes may be built very quickly; it being only necessary to leave the forms for the wall in place for ten hours before placing the top, which completes the manhole.

The data given in the tables, based as they are on work of one gang on jobs where practically the same kind of soil and conditions were encountered, and on records carefully kept and tabulated, leave no grounds for doubt as to their values for comparative purposes. Although these manholes were the smallest standard size built on conduit runs, it will be seen by a comparison of the costs given in

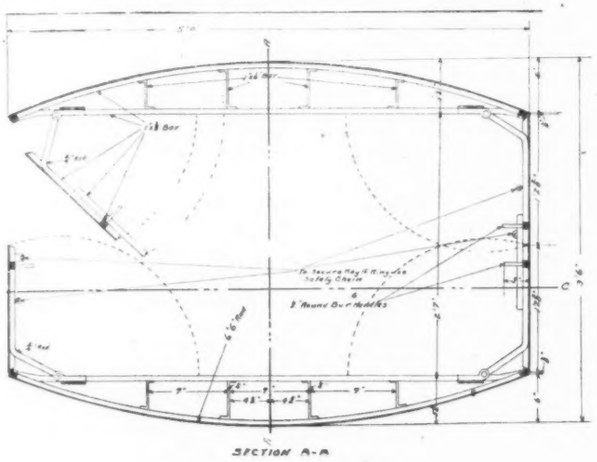


Fig. 9.—Plan of Steel Form.

Table 1, with those given in Tables 2 and 3, that the material for a brick manhole cost 33 per cent more than the material for a concrete manhole, and that the labor cost of building a brick manhole was 43 per cent higher than for a concrete manhole built with a sectional wood form, and 71 per cent higher than for a concrete manhole built with a collapsible steel form. This difference in cost increases pro rata to the increase in size of a manhole, so that an 8 by 6-ft. manhole—such as are built on a 13 to 24-duct conduit run—if built of brick, would be more than double the cost of a concrete manhole of similar dimensions. This may be readily perceived when we consider that, except in excavating, there is only a small difference in labor cost between a 4½ by 3½-ft. and an 8 by 6-ft. concrete manhole, because, as experience has taught, the mixing and placing of an additional cubic yard or so of concrete, once the mixer is in operation and the placing of concrete started, cost very little more, and the cost of setting up and removing forms is no more; whereas, in building a brick manhole, the services of a bricklayer and helpers are required for a length of time that depends almost entirely on the number of bricks to be laid, and increases with each increase in wall surface.

From a structural point of view, an advantage of concrete for manhole construction is seen in the smooth and even wall surface of a concrete manhole, which is difficult

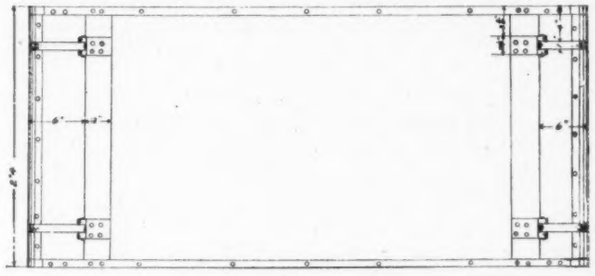


Fig. 10.—Longitudinal Section of Steel Form.

to obtain where brick is used. This is of considerable importance as an additional precaution against injury to cables by scraping against a rough wall surface.

As to the question of durability, the superiority of concrete over brick is now generally admitted, especially for underground structures, as is evidenced from the present almost universal use of concrete in foundation work and in other underground work.

Comparing the two styles of forms used for building concrete manholes, besides the lower cost of setting up and removing the collapsible steel frames, which has already been pointed out, the form cost per manhole is considerably lower where steel is used in making forms, as the superior durability of the steel permits the repeated use of the forms. Wood forms, no matter with what preparation the wood may be treated, soon warp and become useless as a result of the alternate exposure of forms to the moisture of wet concrete in a damp manhole, and to the heat of a sun-baked road. Even a well-made wood form such as that shown in Fig. 2 will warp in a comparatively short time.

New Management for Inter-State Company of Illinois.

Although the election of officers will not take place for several days, those in a position to speak with authority say that Mr. C. B. Cheadle, of Joliet, Ill., secretary of the Illinois Independent Telephone Association, will be tendered the position of general manager of the Inter-State Independent Telephone Company. This company, the head-

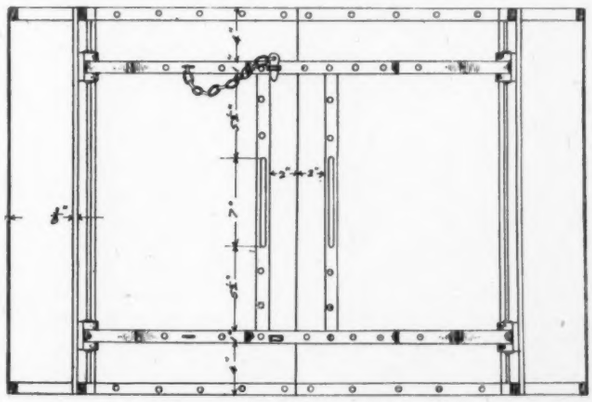


Fig. 11.—Cross Section of Steel Form.

quarters of which is at Aurora, operates large exchanges in many of the principal cities of the state, and has an extensive system of valuable toll lines. Mr. Cheadle will succeed Mr. E. R. Conklin, who has been general manager of the company since its organization, but is expected to retire at the next directors' meeting.

The Telephone Business—Its Opportunities for Young Men

By Charles F. Cannon

A young man's future is such a very important matter that it interests not himself alone but also the entire community in which he lives. Our states and cities provide at great expense schools where teachers give instruction intended to prepare its recipients for their future life of work. Some fortunate ones attend the universities and there receive extended professional training, but a large proportion of the Americans of today graduate from the public schools and then directly seek a business career. On graduation a young man almost invariably takes the first good job which he can secure.

In work, as in all other relations of life, a man's character is his biggest asset. It's record is far more than a profit and loss account, for it is itself the very capital from which all development arises. Ambition is but an offspring of character, and the higher the one, the loftier will be the other. A young man who carries himself with dignity, and maintains a good deportment, if he establishes a reputation for these attributes need have no concern for tomorrow's wants. His services will be in demand providing—and here is the point—he is capable of doing something. In the present day, it is better to say, some *one* thing.

Inclinations, or natural adaptability, have much to do with the selection of a position in business. This is human nature and perfectly right, but unless that liking or adaptability leans toward a high calling it should be fought, and the mind trained to other work. The easiest work is not necessarily the best.

The telephone business offers big inducements to good men. The business is so big that there is no man too big for it. Public-serving in its nature, the telephone man is more or less, according to his position, a public servant, and consequently a real feeling of looking out for the interest of his community broadens and dignifies his work.

The practical work in a telephone exchange is intricate, and requires brain exercise to keep the plant and records in shape and free from trouble. No live man need worry about danger of getting in a rut in the telephone world. There is constantly some new article being produced and there is a continual demand for improvements in apparatus and methods. Original ideas are eagerly sought, and if found worthy no expense is spared to carry them into effect. The mechanical and electrical experimental field in itself allows much opportunity to give the brain fresh air. Every day brings to light a new problem needing a practical solution.

The environments are invariably elevating. Telephone exchanges in our big cities are widely advertised as being among the most interesting sights to behold. The delicate apparatus with its clicking relays, dropping shutters or flashing signals, to the lay mind seems almost superhuman, but to the sophisticated the mechanism is simple. It is true that no simpleton could be an apparatus man, but this is the highest recommendation the work can receive, as it assures the young man that his associates must be thinking men, with good intellects.

There are many varieties of duties. The work of a large exchange is divided among many departments, the scope of which is so great that the man who can master them all is indeed a genius.

The telephone world is filled with men of brilliant achievements with whom the young man is brought into frequent contact, giving him the advantage of studying under men who are equal to college professors as teachers. Thus he cannot help building character, and if the material is within him he cannot fail to become a powerful man himself, if he will but take advantage of his opportunities, and grow to fit himself for an active and useful future.

The efficient telephone man is well paid, and as a result of the continued rapid growth of the business his services are eagerly sought. Perseverance is essential. It takes time for accomplishment in this, as in all other work. There is no room for the laggard, mistakes are costly and one's wits must be vigorously exercised. Advice to the beginner may be summed up: "Learn each part of the work well, think, and improve the conditions as you find them."

A suggestion never comes amiss, it proves at least that its maker is interested in his work. A man gains more in reputation with his employers by installing one good improvement than years of hard, conscientious work on the plans of others will bring him.

When one thing is mastered it is time to take up another and master that, and so on until one is recognized as a leader in his particular branch of the work.

Generalization of studies enables one to take advantage of every opportunity to learn about telephone work, whether it is in his own department or not. Men who know like to talk, and will give much information to the man who shows himself able to absorb and use it.

Broadening acquaintanceship is a sure step to advancement. Every man in one's own line of business is a brother, and there need be no hesitation to ask him questions. A courteous request usually brings a courteous and ready response—but if it does not, there is no need to feel abashed.

In the office where the writer of this article is employed the organizing, capitalizing, building and operating features of a great telephone system are constantly before him. The work is technical and broad, the projects are large, and far-reaching in their influence, hence the necessity of accurate and quick results. These conditions enlarge one's capacity and give him an opportunity to grow. What is true in this individual case is true in the large majority.

The young man who starts in the accounting department of a telephone office will have exceptional opportunities to learn advanced accounting, also a firm foundation in telephone management. The financing of the companies is directly under his eyes, and he will learn the method. He will be subject to rigid rules of discipline, but if he shows ability it will soon be detected and he will find his work appreciated. One of the best features about large companies is that they have men at the head of departments who have "gone through the mill," and know when work is well done.

We have considered thus far the young man in the large office, yet in the country districts the telephone has become almost a necessity. The manager of a small exchange must be an all-around telephone man, it is true, but it does not require years of preparation to fit him for his duties. For proof, witness the men who have charge of our exchanges; many of them are in their twenties. In such a position a young man has an opportunity to display his ability. The work is entirely in his hands and the valuable results to his credit. He is responsible for its success, financially, is appealed to by the community for sustenance and betterment of service, and is considered a benefactor inasmuch as he is engaged in supplying a commodity which is of benefit to all. There is no business where a man's personality or ability is allowed greater

scope. Today the telephone in a small town or country district is its greatest convenience, and the most popular public utility in the land. The manager of that business is of necessity a popular servant of the people, and if he is courteous and capable he will rise to be one of the most respected citizens in his locality.

Telephone companies are looking for the right men to take charge of their plants and pay well for their services. If a man is successful in his exchange the news travels to other localities, and he is given the opportunity of handling bigger propositions. He can attend national and state conventions where he meets other men in the same line of work, and has the privilege of exchanging experiences and views with other men of ability and experience.

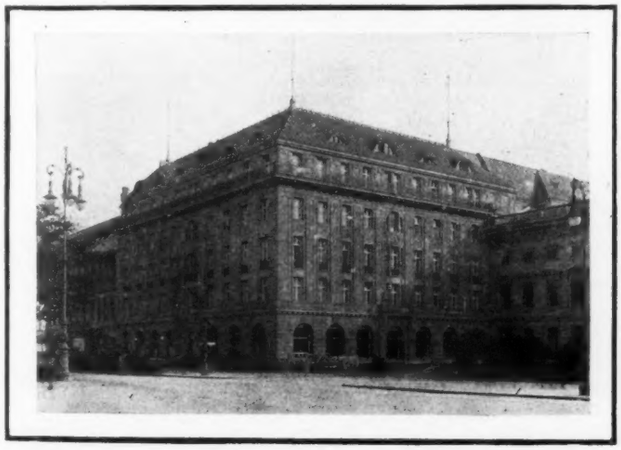
A European Hotel Telephone System

By Dr. Alfred Gradenwitz

The telephone and signaling plant recently installed at the Adlon hotel at Berlin is quite unique as far as continental plants are concerned, and provides the utmost convenience and safety to the guests of the hotel. The latter, it may be said, has been erected on Pariser Platz on a site formerly occupied by a building due to the famous architect Schinckel, and combines the necessities of an up-to-date hotel building with the graceful appearance of the other houses surrounding this beautiful square.

The rooms of the hotel are mutually connected by telephones through a local exchange, so that communication can be obtained from any room with any other room of the building. Furthermore, conversations over the long distance telephone with any place accessible by telephone can be had from each room with the same apparatus as used for local circuits. The instruments are fitted up in such a way as to be readily accessible from any place and are of highest acoustic efficiency. Travelers may thus from their very bed communicate with cities as far distant as Paris.

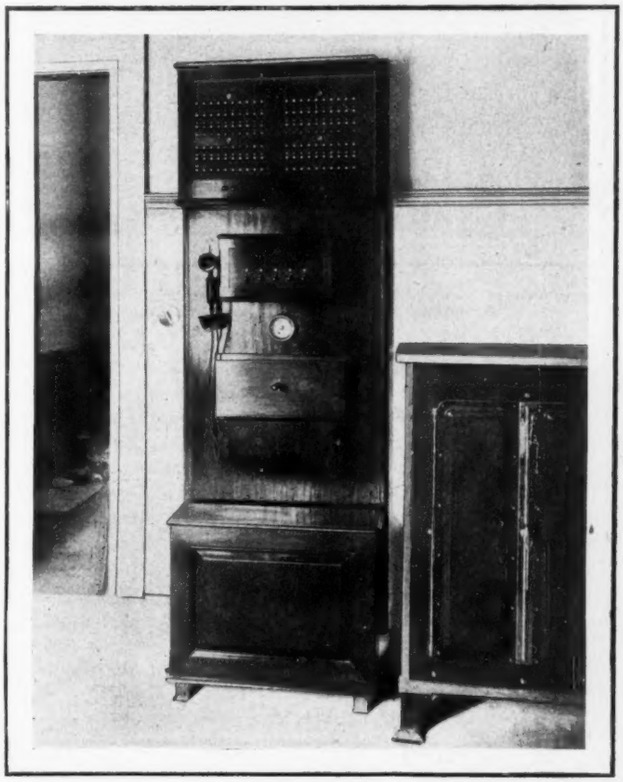
The telephone switchboard is one of the first of its kind on the Continent designed to operate on the common battery system. Connected to it are 400 pairs of wires to local stations, carried inside the walls so as to be hidden from view. These may be connected with any long distance telephones (which in Germany are well known to be under the exclusive control of the postal department). In the switchboard lamp supervisory signals render any premature severance or disturbance of a connection improbable. Three specially trained operators are in charge of this local exchange, and in addition to effecting local connections will procure any desired connection with distant places. In order to facilitate the telephone service with foreign customers, operators acquainted with the principal languages are employed.



Hotel Adlon, Berlin, Equipped with Modern Telephone System.

Special telephone plants, in addition to the branch exchange for the use of guests, are provided for the kitchen elevator leading to the various stories, as well as for the internal telephone circuit between the restaurant, kitchen and cellar, these systems having no connection with the branch exchange.

An interesting feature of the hotel is the optical signaling

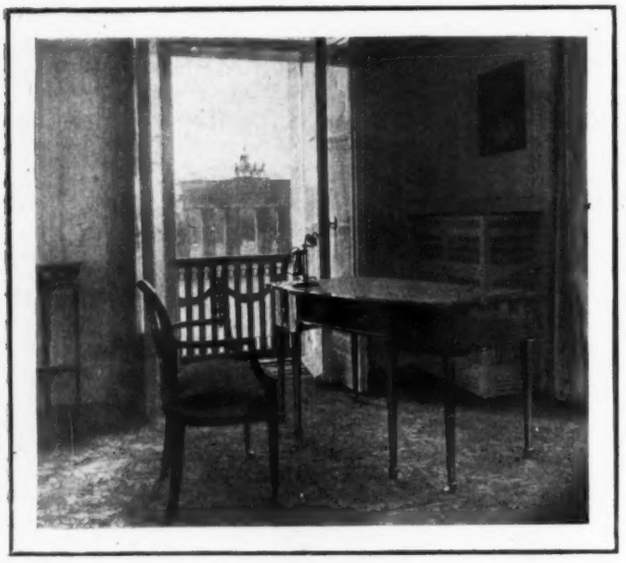


Signaling Station, of the Type Installed on Each Floor.

plant, which does away with any noisy bells. Bell signaling plants, apart from their noisy operation, are inconvenient, because of the necessity of inspecting the office board in order to ascertain which room has called up. The optical signaling plant at the Adlon hotel comprises an incandescent lamp lighted with a pale green light whenever the occupant of the room desires some service, while a group lamp in the corridor at the same time indicates which of the three buttons (corresponding to the three kinds of service) has been actuated. Further signals are finally given at the offices on each floor, as well as at the checking office, where composite glow lamp boards will indicate the number of the calling room and the kind of service wanted. As soon as the service has been rendered, the lamps are put out, thus signaling everywhere that the wishes of the guest have been complied with. As, immediately after calling, the incandescent lamp above the door of the corresponding room is lighted, a servant is in position to attend

to several rooms in succession. This noiseless, though strictly reliable service will always safeguard the quietness of the hotel, and is a valuable adjunct to the telephone system.

Incandescent lamp boards are further fitted to each of the elevators actuated from the entrance of the elevator pit, each signal being made visible in each cage. Each elevator operator is thus able to ascertain at a glance where the car is required. As soon as one car starts, the calling signal in the other cars is



Telephone in Royal Room, Hotel Adlon, Berlin. View on the Bradenburger Thor Through Open Door.

extinguished. Each car contains a lamp board with a lamp for each story, in addition to which a lamp board indicating the actual position of the car is installed in each story, as well as in the basement. Below the lamp board there is a button for calling the cars. This arrangement insures a considerable saving of time and extraordinary safety and rapidity of service.

This hotel is also equipped with an automatic electric fire alarm, controlled by thermostats and electric clocks in the rooms of the guest, which are kept in synchronism by a main clock adjusted to standard time, as furnished by the Observatory at Berlin.

The plants described, which have been installed by the Messrs. Mix & Genest Co., are operated by means of six storage batteries installed in the room provided for the lighting plant. These are charged from a special dynamo, the motor of which is connected to the city's direct current system.

All necessary measuring apparatus and switches are conveniently arranged on a single marble switchboard, in which the feeders of the various plants terminate, so that the whole of the plant can be controlled from this switchboard.

The simplicity in the arrangement and operation of this plant reduce the possibility of a breakdown in either the telephone or signaling systems to a minimum.

Correcting Abuses on Rural Telephone Lines.

The telephone companies of Illinois are fully alive to some of the practices which prevent them from giving subscribers on rural lines the best service, and are endeavoring to educate them to the proper use of the system. The publication in local newspapers of interesting articles showing how to get the best results from the use of rural lines is decidedly helpful, and the following, now being printed in several Illinois towns, is a valuable example of such material:

The rural telephone has been a great blessing to the farmers all over the western country. It has done very much to break up the isolation of the farm as well as to save long trips to town. It is a wonderful help in time of sickness and at threshing time; in short, is an improvement which farmers would not get along without at any reasonable cost, and most of them thoroughly realize this, and consider the telephone indispensable.

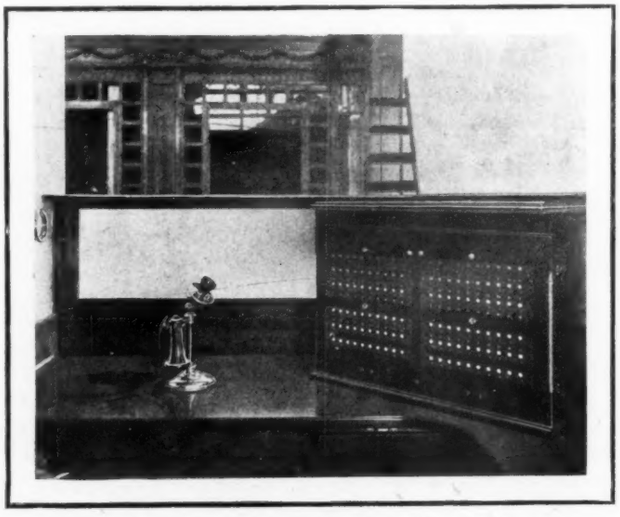
There are, however, some very grave abuses in the use of these rural telephones. They are so constructed that when a call is made for one member it is heard by all, and any person who wishes to go to the telephone whenever the bell rings can be in touch with the gossip of the whole community. In other words, the telephones are used for eavesdropping.

This is conceded by all to be one of the worst of the small vices which a child may contract, and every sensible parent takes every care to control the natural curiosity of children about everything that is going on by pointing out to them the necessity of attending strictly to their own business and paying no attention whatever to the things that do not concern them.

How can a child be impressed with the essential meanness of eavesdropping, if parents rush to the telephone and listen purposely to the conversation that their neighbors may be carrying on? The remedy is easy. Never take down the receiver except in response to your own call, and never allow a child to do so. Give him to understand that eavesdropping over the telephone is quite as dishonorable as eavesdropping in any other way in the home or at a neighbor's. The best way to impress this upon him is to never take down the receiver except in response to your own ring.

Some farmers are taking out their party telephones simply because they do not wish to have their conversations with intimate friends or with their physicians, or with the buyer of live stock listened to by their neighbors; and in this they are doing exactly right.

There are other abuses connected with the rural telephone system, but all could easily be corrected if the managers would limit conversations, as they have done in town, to three minutes and charge for longer use of it. Any farmer or farmer's wife can say all that needs to be said in three minutes, whether it be about buying a new horse, the baby's teething, John's cold, or the new dress pattern, or the prospects for weddings in the neighborhood. The



Special Switchboard for the House System, Hotel Adlon.

rural telephone is a wonderful help to farmers, but like all other good things it may be and in some cases is very greatly abused, to the moral detriment of those who abuse it.

Rural Telephone Construction Costs

By Edmund Land

When a comprehensive history of the telephone business in America is written, a chapter will undoubtedly be devoted to the detrimental effect which cheap and inadequate rural line construction has had in the development of the industry, as militating against its most rapid growth as a well established and permanent business.

It is true that in the early days many rural telephone companies would possibly not have secured a foothold had they been obliged to raise sufficient money to build their lines in a first class and permanent manner. Further deficiencies were due in part to lack of reliable information concerning earnings, costs of operation, etc., which could only come with experience in the conduct of the enterprise. It would, however, seem at this date that, all such doubtful considerations having been removed, little excuse is left for such a class of construction.

In spite of repeated demonstrations, through actual operation, of the permanency and earning power of well-built rural telephone systems, cheap and inadequate construction in certain localities still goes on, the projectors and builders failing through ignorance or design to be guided by the riper experience of others who have tried such methods of building and have found them wanting in permanency.

Local newspapers quite often contain accounts of the operations of rural telephone companies, and show ridiculously low cost figures for the building of their lines. Several of these accounts were recently brought to the writer's attention, and one in particular by the Editor of TELEPHONY, with a request for the writer's comments, presented in this paper.

Fortunately such accounts often contain specific information regarding the character of construction referred to, thus allowing the cost figures to be more or less closely analyzed. Some of such cost figures run about as follows:

RURAL BRACKET LINE, COST PER MILE.

30—18 ft. poles at .10 cents each	$ 3.00
Digging holes, setting poles, and hauling	3.00
Iron wire, No. 12 gage	7.00
Labor, stringing wire	2.50
Insulators, brackets, nails, etc	1.10
Total	$16.10

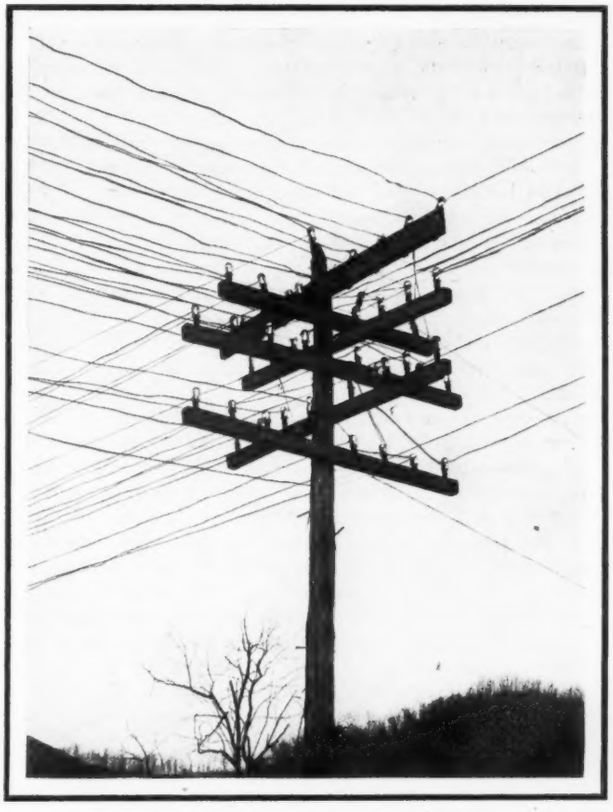
Truly, there would be much more profit in this branch of the telephone business than there really is if such a schedule of costs represented good and permanent work, and the lines which could be built on such a schedule were fit to give continuous and first-class service.

A perusal of some of the articles before referred to indicates that at times, two or more crossarms are placed on 18 ft. poles.

The injury to the telephone business from such methods of construction is at times great and manifold, in that the deleterious effects on service are not confined strictly to the company owning the lines, but injure the service of all connecting companies, producing, to a greater or less extent, an undesirable impression upon the general public. It hinders their efforts to get business and perhaps retards the sale of their securities also.

Under such methods of construction the first cost being low, large earnings are apparently made on the investment and dividends are perhaps paid for the first year at the rate of 20 per cent or more on the invested capital, with perhaps no surplus laid aside. Each year of operation, however, sees the dividend rate decrease until finally a dividend of even 6 per cent on the investment cannot be earned, due to the yearly increased cost of maintenance of the poorly constructed system. Then comes the fireworks, the disruption of the little company, or at least trouble, friction, and dissatisfaction in its ranks.

During all the years that the fence posts have graciously continued to carry their load of wires, they have done so only under protest, such protest being expressed from time to time by their bowing under the load at times, or other evidences of weakness, and have thus together with the other weak elements entering into the line, been the cause of much poor service and dissatisfaction to the telephone using public. Under such conditions these lines have well earned the name of "shoe string lines," which name by the way seems quite a "pat" expression when applied to this insufficient construction.



An Example of the Kind of Line Work Which is Cheap to Install, But Expensive to Maintain.

No, my farmer friend, or other person considering the building of farm lines, suitable telephone wire, No. 12 gage, cannot be purchased per mile of metallic circuit for $7.00, nor can poles be purchased for 10 cents each. Wire cannot be properly strung and tied in per mile of metallic circuit for $2.50, unless the workers are prepared to put in their time for practically nothing, and for the same reason holes cannot be dug and poles properly set 30 to the mile for $3.00, to say nothing of the fact that 30 poles to the mile is not the best construction in the world. And it goes without an argument that two wires are necessary if any good service at all is to be given.

Experience has proved that the best materials which money can buy are none too good for rural line construction, including in the word construction, switchboards, telephones and all other accessories entering into the plant as a whole.

Then why not spend sufficient in this class of construction to insure a permanent investment, low annual charges, and reliable service?

Railway Train Dispatching by Telephone

By Frank C. Perkins

The accompanying illustration shows a typical signal and telephone installation on the high speed interurban electric railway between Boston and Worcester, Mass. For efficient telephone train dispatching it may be stated that the requirements include a well installed, well maintained metallic circuit line, used for dispatching only, with good telephone apparatus properly installed and maintained. The dispatcher and car crews should never be delayed an instant in the use of the telephone by its use for other purposes, nor be subjected to interruptions in the use of the telephone by others attempting to use the same line for other than dispatching purposes.

It is evident that when the line is built the utmost care is taken to run it as free as good material and careful construction can make it from all possible risks of trouble, and that it is carefully maintained free from tree contacts and other grounds. A little additional care and expense in the first installation insures a good, uninterrupted service so essential for a dispatching telephone system, and proves a real economy by reason of low maintenance cost. It is a mistake to use twisted pair rubber covered wire in the line, even where it runs through trees. The twisted wire will cause much more trouble than plain bare wire. In such cases the trees should be so trimmed as to keep them from causing tree grounds, or the wire in some way supported on an insulator so as not to rub against the tree.

It is claimed that the Blake signals of the type shown in the illustration properly should be installed on substantial poles, having tops at least 9 inches in diameter and 13-in. butts, poles to be no less than 26 feet long and set 6 feet in the ground and well tamped. When the soil is especially light and sandy the poles should be set in concrete. It is extremely important that the poles on which the signals are set should be substantial and solid. Such poles insure the positive and reliable working of the signals, and are a real economy, in that they eliminate troubles and maintenance expenses arising from poles that are too light and not securely set. The same remarks concerning the telephone line are applicable to the signal line, excepting that the signal line consists of a single bare wire instead of two. The signal line, as with all other electric circuits, must be kept free from grounds.

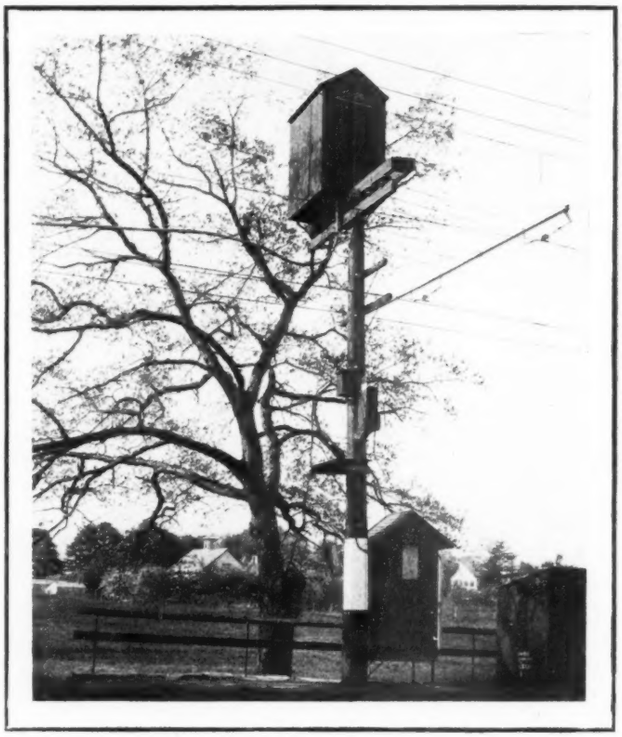
It is important that a reliable dispatcher's signal be used. This is essential for the safe and prompt handling of trains by the telephone dispatching system. The signals shown in the illustration are entirely under the control of the dispatcher, enabling him to set a 3-ft. semaphore arm and red light at any telephone point, indicating to the crew of any approaching car that he desires to communicate with them.

These signals are also used to prevent accidents resulting from "cross" orders, and to mark advanced meeting points, thus greatly increasing the safety of traffic.

It is necessary that a light, well ventilated dispatcher's office be provided so located as to be subjected to as little noise as possible. The dispatcher's door is furnished with a good lock, and is generally kept locked from the inside, being, if possible, so located as not to be exposed to interruption by employees or strangers, even to such an extent as is occasioned by their trying the door. No one but dispatchers may properly be allowed in the dispatcher's office, unless by permisison of the superintendent or other higher official of the road, excepting, of course, car crews, and other employees when on duty and having business with the dispatcher concerning their immediate duties. In short, the dispatcher is kept as far removed as possible from disturbances, and from having his attention distracted from his work.

While portable telephones, iron box line telephones or telephones locked within booths are very commonly used at sidings and along the line, it is nowadays considered preferable in many parts of the country to have at each siding a telephone locked within a neat, suitable sized, well built wooden telephone booth, containing, besides the telephone, an automatic register which automatically triplicates the written order. There should be ample light, furnished in the case of electric roads, by an incandescent lamp, within each booth.

It is maintained that the advantages of telephones located in booths are as follows: They protect the members of the crew from the weather while receiving orders, thus insuring their faculties being concentrated on the proper understanding and writings of the order; they keep out noises made by passengers; enable the men to better write an order as received because material can be properly located and arranged



Installation of Telephone in Booth, and Signal on Interurban Railway.

for readily writing the order. The booth also insures that the orders and conversation in connection therewith are practically confined to the ears of the crew or person for whom they are intended. The wooden booth furnishes a certain protection to the crew against possible electric shocks, and thus prevents the crew from becoming "telephone shy."

In telephone train dispatching it is maintained by some of the best signal engineers that the best and safest method for crew receiving orders is as follows: motorman to bring his car to a stop with front platform as nearly as possible opposite the telephone booth; conductor to go promptly to the booth, unlock it, and call up his dispatcher over the telephone, and as he (the conductor) receives the telephone orders he writes them down on the triplicator. Having read the order back as he has written it, and received an O. K. from the dispatcher, the conductor then signs his name to the order, comes out, goes on the front platform and the motorman takes the

memorandum and at once goes to the telephone booth and repeats to the dispatcher what the conductor has written. Upon the dispatcher giving him a "complete" the motorman signs his name, hangs up the telephone, takes the original of order for himself, and hangs it up before him in his compartment, and gives the duplicate to the conductor, leaving the third copy locked up in the booth for the management.

Of course it takes some time to write out the above description, and it may seem to be an unnecessary time-consuming method, but with well trained and disciplined men the above method should consume not an appreciably greater time than where one man writes the orders. The advantage in having the conductor write the order is that he is obliged, in the course of his work, to do more writing than a motorman, and is generally selected for his job because of being able to write easily and legibly.

The advantage in having the motorman report back to the dispatcher the written order is that it insures the motorman getting the order at once, and before he has had a chance to proceed with the car. It also insures the motorman reading and understanding the order, and impresses it upon his mind. It insures one man reading what another man has written, thus eliminating any chance for a misunderstanding of words or numbers, and also eliminating the chances that a man will write one thing and say something different, which may occur in a transposition of figures, or a momentary lapse of mental activity.

It is claimed that all or any of the above things may happen if only one man receives and writes the orders, whether he be motorman or conductor. The above method contains in its favor all of the arguments which may be used for the practice of having either a conductor or a motorman receive the orders, and eliminates all of the arguments which may be used against either the one or the other receiving the order, and has in addition the advantages stated above which the one man method does not have. The only possible argument that can be used against it is that of taking too much time, and this is really not appreciable in practice.

It is becoming recognized that the telephone, with suitable auxiliary signals, furnishes a safer and better means of handling trains than the telegraph for the following reasons: with the telephone the dispatcher is communicating direct with the train crew whose lives may depend on the proper understanding and execution of the order, whereas with the telegraph the dispatcher is giving the order to an operator in a station or tower, who can at best only lose his job if any mistake is made. Second, a mistake is much less likely to be made if an order is given directly to a person responsible for its execution, as is done with the telephone, instead of giving it through a third person to be repeated by him to the man who is to carry it out. It is well known that the greater the number of hands through which an order has to be passed the more liable the order is to be misinterpreted or misunderstood. Third, the telegraph is a more or less slow and cumbersome means of transmitting a message, and orders must be reduced to the least possible words. Very often, however, the addition of a single word may enable the person receiving the order to better understand it. This additional word can be given over the telephone without causing delay. Furthermore, in case it is necessary to repeat, this can be done more rapidly than by telegraph.

It is often said that the telephone, because it transmits sounds, is liable to errors and misunderstandings, and that a word or number spoken over the telephone may be easily misinterpreted or misunderstood. This is perfectly true, but does not exactly the same argument apply to the telegraph as well? The telegraph transmits its message by means of a series of sounds, which are just as capable of being misunderstood or misinterpreted as sounds over the telephone. Indeed, the sounds over the telegraph are so short and follow each other so closely that they require an extremely well trained and expert operator with his mental faculties exceptionally clear and active to understand them at all.

In connection with a reliable signal, under control of a dispatcher, the telephone is a better, safer and quicker means of communication than the telegraph, and is coming into extensive use in this country as well as in Europe not only for electric interurban and suburban railways, but on the most progressive steam railways.

The Student Operator

By H. E. Davis

The student, or learner, as she is called in many of the smaller exchanges, is during this period of her career in a position where she probably requires more careful training than in any of the other grades of advancement which will mark her progress in proficiency as an operator. The writer believes that the future efficiency of the operator depends largely on the training she receives while she is a student. This is why her training as a student should be very thorough, so that when she enters upon her duties as an operator, and deals with the public, she may understand just what she is expected to do.

It is while the operator is a student that all of the most essential points in connection with the handling of equipment, and of all regular and every class of irregular calls, should be carefully taught her, as at this stage she has as yet not learned the different little habits of each individual operator. She will learn these later, and they are not half so hard to learn as the operating rules. By the "little habits" are meant the various schemes which many old operators use to violate the operating rules. This violation of the operating rules is reduced to a minimum in exchanges where an observation desk and monitor's desk are used.

There seem to be just about three different kinds of students: one type whose members learn quickly, a second variety, learning fairly rapidly, and retaining the information acquired. Then there is the slow and indifferent girl. She should be eliminated as soon as the condition becomes apparent. While she might, with the proper treatment and training, eventually make a good operator, it would be a time consuming and costly process, and in the meantime her influence over the operating force is likely to be conducive to bad discipline.

As soon as the student reports for duty in a company of moderate size the head of the operating department may with advantage take time to talk personally with her, going carefully over the things which she is expected to do and the possibilities of her working into a better position. After this talk she may be turned over to the chief operator in the operating room, who immediately starts her training. In small exchanges, having up to sixty or seventy operators, the best results are obtained when operators are made to feel that they are being watched

carefully and personally and that their salary depends on their value to the company.

In dealing with the student the following method has been tried out in an exchange not equipped with a student board.

After the student has been placed in charge of the chief operator she is given her personal number and a locker is assigned to her. She is then given one-half day to read the operating rules, so that she may become familiar with the general outline. Continuing this plan to make her familiar with the operating rules, she is for some time required to spend an hour a day studying them until she has become perfectly sure of the contents and meaning of the book of instructions. She is also instructed as to the necessity of using the precise phrases set down in the operating rules, and the necessity of reporting in before her hour of duty in case of sickness or her inability to be on duty; also that no excuse for tardiness will be considered. The method of dealing with tardiness is to establish a rule that the operator who arrives late must remain in the rest-room until ten minutes after other operators have been seated. This method brings the operator into the room after all other operators are at work. Most operators take this as a sort of punishment and disgrace, and are very careful to be on time, after the first tardiness.

The student is instructed as to the necessity of being quiet while in the building, especially in the operating room, and that in entering and leaving she should not make an unnecessary amount of noise. In many exchanges the operating rooms are provided with rubber mats or linoleum floor coverings.

Assistance is given the student to enable her to learn quickly how to handle the equipment, and take care of the adjustment of her transmitter and receiver. Instructions as to her being courteous and pleasant to her subscribers cannot be gone into too carefully, and are emphasized in connection with many items of the routine.

After having received the general instructions covering the points above mentioned, the student is taken into the operating room, and placed behind another operator. Now she wears a head set and transmitter, connected in regular form to a plug which is inserted in the duplicate operator's jack. She listens and watches the other operator during at least one day before she is given any instruction other than the designation of the use of front and back cords, and the use of the listening and ringing key, the line lamp and supervisory lamp or line drop and clearing-out drop. Soon she becomes familiar with the answering jacks and multiple jacks and the multiple markings.

From the listening position she goes to a regular operating position, lightly loaded, where the chief operator of a supervisor gives her almost constant assistance and supervision. The placing of the new girl at a position, to deal with subscribers, is done at a time when the lightest load is on, and she is placed on the position having the lightest load on the whole board. Operators on either side of her have special instructions as to taking care of calls which cannot be handled by her. With the chief operator or supervisor beside her, there is very little risk of poor service, as it is the duty of the chief operator or supervisor to see that all calls are taken care of promptly by her operators, and the team work of the neighboring operators prevents unanswered calls from accumulating.

Probably the best time for practice work in nearly all the smaller exchanges is between two and five p. m.

After the chief operator or supervisor has worked with her until she has a good understanding of her work (this generally requires about two days) the student is placed in a position next to a senior operator who watches and assists her until she is ready to be assigned a regular position. It is a good rule to have a student at least two weeks on a practice position before she is assigned a regular position. If this rule is followed, much of the poor service due to the mistakes of new operators is eliminated.

Putting Our Information Where It Will Be Useful.

By J. W. Scott.

In the columns of TELEPHONY the writer sees many articles telling just what telephone men have done to improve their plants, their operating, or their methods of getting business, written by the men who have put these improvements in force, and proved their worth. Such articles are valuable and more of them should be written by the managers of our small exchanges.

It matters not whether these various ideas be adopted by others in their entirety, in part, or not at all, they are valuable. The first common battery circuit, the first selective system were not good, according to present standards, and they are not now recognized in the improved systems of today. But those first suggestions were the bases upon which rest the perfected common battery and selective systems of today. The influences of these first ideas were great, although they were hardly worthy of being put in practice when first set forth. The main fact is that they attracted attention to a problem, and gave a suggestion to men who were able to experiment, and finally devise something more practical.

The writer believes that there is no item of information concerning the slightest detail in the management and operation of a telephone plant which is too insignificant to be worth recording. Accurate sources of small information often open the manager's eyes when a comparative statement is drawn with the previous month's or year's work. Directors do not always agree with the manager when an item of eighteen or twenty dollars per month is to be added to the pay roll for a girl to keep such a record and do other work. With the larger companies, statistics are kept. The small company, with which this paper deals, sadly neglects this feature and money is lost thereby. For instance, do you ever notice your canceled and uncompleted toll checks and investigate them closely? You may find that your toll operator is lazy, lax or careless. Do you inspect trouble tickets to learn where your plant is weak and how long your inspector is gone on simple cases of trouble?

There is a well defined line drawn in the development of a plant, reaching of which means that the exchange demands cable for its proper and economical operation. No company nor manager should ignore this proposition. There should be no hesitation on account of expense, with new business knocking for admittance. Neither should there be timidity or fear of over-estimating possible future demands for service. It is less costly to a company's earnings, business possibilities, reputation and business standing to have an over-expenditure in this line than to be unable to meet a demand for service. The immense loss resulting from under-estimation, and duplication of cable construction by repeatedly running in cables of too small size cannot be estimated.

After drawing specifications for new cable work to serve a section of the average town of five or six thousand, in the belief that it provides a large enough capacity for five years, just add twenty-five or fifty pairs and seal them up! The writer knows of a man who secured and now holds a fine position by virtue of his habitual "error" of building too well and big.

It was not a desire to reduce the price of service that caused the telephone companies in the small cities, with a rate of $18 and $24 to talk so vigorously of the beauties of selective signaling, to resort to duplexing, etc. Rather was it that their cables were too small, lacking capacity to handle new business, in eight instances out of ten.

If we had all put our experiences in this line on record long ago, some of us would have been able to forecast the future better and conduct our business in such a way as to make larger profits.

Telephone Law

Conducted by A. H. McMillan

Nebraska Franchises.

Will you kindly advise what the status of a telephone company operating in a town in Nebraska, in which poles were placed in streets and alleys and a general business conducted before the town was incorporated, is after the town incorporates and no franchise is issued? In case a short time franchise was granted what would be the status of the company after the franchise had expired?

A telephone company operating in an incorporated town in Nebraska would have its authority for so doing in a statute giving any company doing business in the state a right of way along any of the public roads of the state for the erection of poles and wires, provided the poles shall be set at least 6 feet within the boundary of the roadway, and placed so as not to interfere with a road crossing. Compiled Statutes of 1895, Chap. 89a, Sec. 14. This statute does not give a telephone company the right to carry on a telephone business within the streets of a village because it is held that the term "public roads" does not include "city streets." Nebraska Telephone Company *vs.* Western Independent Long Distance Telephone Company, 95 N. W., 18.

It is therefore our opinion that the status of a telephone company, after the town incorporates, it having no franchise, is that of illegally doing business in the streets. The status would be the same in case a short time franchise was granted and such franchise expired.

Subscriber Is Responsible for Payment of Messages Sent From His Instrument.

A decision that each subscriber is responsible for the payment of charges for all messages sent over the telephone was recently rendered at Atlanta, Ga., by Charles J. Dougherty, Esq., sitting as Special Judge, in the case of R. D. Goss *vs.* Southern Bell Telephone & Telegraph Company. The plaintiff sued to recover damages for the alleged wrongful removal of one of his telephones from his office in Birmingham, Ga.

Mr. Goss was a subscriber of the company, and received a bill for exchange rental and long distance charges, to the amount of $3.10. He offered his check in payment of the exchange rental charges, claiming that the long distance messages were sent by other persons than himself. He was informed by the company that his check for rental would be accepted, but his station would be barred from further long distance service unless the toll charges were paid. The plaintiff refused to allow this to be done, and withdrew his check. After his bill had run another month, his telephone was removed, and he brought suit for damages.

The court rendered a judgment in favor of the telephone company on its plea for recoupment for the unpaid exchange rental and long distance charges, holding that the company was justified in removing the telephone, and that the plaintiff was liable for the message even if sent by a person other than himself.

Said the court: "If a subscriber could, under the law, allow his telephone to be used indiscriminately by the public without himself becoming liable to pay the charges for such service, not only would the telephone company suffer great loss, but its ability to properly serve the public would be greatly impaired, if not totally destroyed. This is too evident to need comment. The telephone instrument is under the charge and control of the subscriber, and he alone can prevent unauthorized persons from using it. The operator in the central office cannot know the voice of each subscriber, and that of the members of the family, and the persons in his office. The operators are constantly changing and new subscribers are being added daily. The only course, therefore, that the telephone company can pursue is to hold the subscriber liable for long distance messages sent over his telephone."

Excessive Telephone Charges When Paid Cannot Be Recovered.

The Illinois Glass Company, a subscriber of the Chicago Telephone Company, sued it to recover telephone charges alleged to be excessive, and was held not entitled to do so. The ordinance passed by the City of Chicago authorized the company to do business in the city for 20 years, and required it to file with the acceptance of the ordinance a schedule of rates which it was prohibited from increasing. The company accepted the ordinance, and filed a schedule of rates showing $125 to be the charge for a business telephone within the territory where the Illinois Glass Company was located. The glass company became a subscriber, and for many years used a business telephone, which was on a grounded line. It was alleged that eventually the telephone grew less efficient, and did not give satisfactory service. An improvement known as the metallic circuit was devised, which obviated the objection to the grounded line. When the credit man of the glass company complained to the telephone company of poor service, he was told that the improved equipment would give better service, and would cost $50 a year additional. After consulting with a general officer of his company, he made a contract for the improved telephone at the additional rate. The glass company paid its telephone bills for five years, paying $209.97 in excess of the rates fixed by the ordinance, and then brought suit against the telephone company to recover the amount. In the Superior Court of Cook county, the telephone company won, and the case was appealed to the Supreme Court of Illinois, where the judgment for defendant was affirmed.

The glass company contended that it had paid the excess rate on account of "business necessity," and was therefore entitled to recover it back. The court overrruled this contention, holding that the customer of a telephone company cannot recover excessive charge for service voluntarily paid without fraud, mistake of fact, or other ground for annulling the contract. Counsel for the glass company contended that there was a distinction between payment to an individual and a public service corporation. The court stated that it had never recognized this distinction, and would not do so in this case.

Illinois Glass Co., *vs.* Chicago Telephone Co., 85 N. E., 200.

Collectibility of Long Distance Charges.

An attempt to collect a bill for $2.00 from the St. Louis Consolidated Salvage Company, at St. Louis, Mo., cost the Bell telephone company many times that amount, because it lost its suit.

Last October a long distance call was made from Mississippi for Adam Goldman, president of the Salvage company. The party calling wished to reverse the message charge, and Mr. Goldman told the operator that if the call was for him, and pertained to his business, the reversal of the charge would be satisfactory. After the connection was made, it was learned that Adam Goldman was not the Goldman wanted, but nevertheless the message was charged to him, and he refused to pay it. The trial of the case resulted in a judgment for the Salvage company.

Practical Questions and Answers

PROTECTION FOR BRANCH EXCHANGE CHARGING CIRCUITS.

Enclosed is a diagram of a private branch exchange charging circuit which is giving considerable trouble.

The circuits from the central office, and to board, respectively, give no trouble, being entirely in cable.

The line to board No. 2 is .080 bare copper, running three spans from the local storage battery, and takes the pole pins.

The trouble is that even during a light rain when there was no lightning discharge noticed, lightning arrester No. 2 grounds and consequently blows fuse No. 3. Fuse No. 1 and lightning arrester No. 1 (*L, A* in diagram) are not operated, and give no trouble. It was proposed to run on the pole tops a single .104 copper wire, grounded at each pole.

Would this arrangement protect the charging circuits or would the static induction from a discharge of lightning to the grounded wire be enough to operate the arresters?

It is not apparent to us why fuse No. 3, which is rated at only 3 amperes, should be located between the exposed line and arrester No. 2, the latter being equipped with 7 ampere fuses.

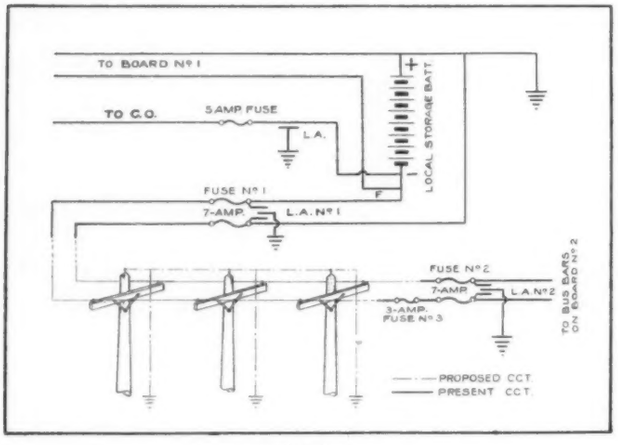


Fig. 1.

We do not believe that the cause of your trouble is lightning, at least not all of it. We recommend that you move fuse No. 3 to a point between arrester No. 2 and the bus bars of board No. 2; this fuse is presumably to protect the circuits and apparatus of board No. 2 and, if so, the location we have recommended is the proper one.

Having made this change, you can then determine whether your trouble has been due to lightning or to a current in excess of 3 amperes but not in excess of 7, which was occasioned by dirty carbons in arrester No. 2 or a ground on some of the circuits. If board No. 2 operates any lines which contain open wire, the ground may occur on one of these. You can have had no severe lightning, or arrester No. 1 would show the effects of it and fuses No. 1 and No. 2 would have blown.

You do not mention any other wires on the three poles in Fig. 1; if there are any other wires you can look for a leak from them to your battery leads, which occurs only in wet weather. We do not believe that you will find it necessary to erect a ground wire as you propose. As a matter of protection to your local storage battery, all battery leads should be fused at the point which we have marked *F* in Fig. 1, with fuses suitable for each lead and the load upon it.

POOR TALKING ON BRIDGED PARTY LINE.

We are experiencing quite a difficulty in talking on a circuit of 12 instruments. While one person is talking to another the transmission will be fairly good, and at the snap of a finger the voice will seem 20 miles farther away. What is the cause? Could it be loose connections, as from joints faultily made? Would a swinging ground bring this about also? Would a poor, run down battery do it?

If the line is a ground return line, a swinging ground will cause the trouble mentioned. If metallic, and there is a ground one one side already, a swinging ground on the other side will cause the voice to weaken in the manner described. These causes will affect all subscribers on the line to some extent. If there is a loose joint in the line somewhere it will cause the same trouble, but its location will affect its result on the line. If between the office and the first subscriber, it will bother all calls from the line to any other line, but the subscribers on that line could talk to each other without interruption. If the poor joint is between stations, only those calls which talk past it will be affected. Remembering this will sometimes give you a clue as to where to look. If the line tests clear of grounds, put the voltmeter on the next time the line cuts out, and see if there is a swinging short circuit, for this will also cause the trouble.

These intermittent troubles are hard to find, for they clear up just when you want to test. Notice whether certain stations only are affected, and if so, whether it bothers only their talking among themselves, or only to the central office.

Run down battery will not act in this way. The voice will often come up strongly at first, and the weakening will be more gradual. Bad receiver cords are a fruitful source of cutting out, and instruments should be carefully watched for this condition.

Telephone News

Long Lease of Ohio Companies Now Being Prepared.

Attorneys are hard at work preparing the lease by which a holding company is to take over the Cuyahoga Telephone Company of Cleveland, the Columbus Citizens' Telephone Company of Columbus and the United States Telephone Company, which owns the Independent long-distance lines in Ohio. Owing to the magnitude of the deal, great care is being taken in the preparation of this document, that it may cover properly all the contingencies that are likely to arise after the new plan is put into operation. It is said that the term of the lease will make it practically perpetual, being 999 years, and that the details have all been agreed upon. The directors of the Cuyahoga and United States Telephone companies at a meeting a few days ago fixed upon Oct. 6 as the date when the plan will be submitted to the stockholders and notices have been sent out to that effect.

While not done for that purpose, the organization of a holding company will clear up all the debts of the United States and Cuyahoga Telephone Companies and place them in even better shape than ever. Both have made exceedingly good records during the past half year, notwithstanding the fact that other lines of business in this section have suffered from the financial depression. Doing away with duplicated office and management expenses will increase the net income, and, it is believed, allow the payment of larger dividends. Many other benefits are expected to accrue to the stockholders as a result of the new arrangement.

It is said that the capital stock of the holding company will be fixed at $10,000,000, but that only $5,500,000 of this will be issued at present. The remainder will be held in the treasury for the purpose of taking over other companies if that ever becomes necessary or desirable. The basis of subscription,

it is reported, will be one-half share for each share in the United States and the Columbus Citizens' Telephone Companies, the par value of the shares being $100, and one-quarter of a share for each share of the Cuyahoga Telephone Company, whose shares have a par value of $50. This would place all upon the same basis.

The Independent companies over the state are well pleased with the plans, and believe that they insure Independent long-distance service for the period of the lease. It will place them upon a much better footing, with this matter settled, and they will be able to go ahead with improvements and extensions in full confidence that they will be protected.

So far as fighting the Bell interests is concerned, telephone men say that this has no part in the plan. There is no intention to go to war with any interest, but the sole object is to give a better service, place the companies on a more substantial earning basis and perpetuate the Independent movement. Both companies will find all the business they can take care of, and there is absolutely no reason why they should dissipate their funds in warring with each other. The Independents will protect each other, of course, and will push their extensions into broader fields, but it is the intention to make it a matter of sound business and not war with some other company.

Franchise Must Be Obtained From California Cities.

About three years ago the city of Pomona, Cal., demanded of the Pacific Telephone & Telegraph Co. (Bell) that it take out a franchise to enable it to carry on business in the city. The company flatly refused to entertain the idea, and after several months' time the city attorney decided to cut the wires of the company in order to force it to bring suit against the officials of the city, so as to test the question in court.

The officials were very careful to cut only the wires of local telephones running from the outside of the city inward. This act did not have the desired effect, so a mile and a half of poles and wires were torn down.

The press of the state took up the controversy between a comparatively small city and a big corporation, and finally the telephone company was forced to bring suit for an injunction and damages. The corporation's main point was that the Federal Telegraph Act gave the company a right to construct telephone and telegraph lines for interstate business without obtaining franchises.

Judge Olin Wellborn of the United States Circuit Court, sitting in Los Angeles, Aug. 31, decided the case in favor of the city, thereby determining (unless overruled by the United States Supreme Court) that cities have the right to control their streets and to compel all telephone companies to obtain a franchise from the general authorities therein; and also to demand compensation and pay for the use of its streets from all telephone companies.

The judge held that the business of the telephone company was so slight as a transmitter of telegrams, that it had no right to claim that it did an interstate business. He held that the taking of telephone "repeats" of telegraph dispatches does not constitute an interstate traffic, and in such cases the telephone company merely acts as a "messenger boy" for the Western Union and Postal companies. He mildly censured the company for endeavoring to conceal, by omission, the amount of business it actually transacted at Pomona, upon which it really based its contention before the courts.

This decision by Judge Wellborn overrules that of Judge Bailey, of Idaho, who sitting in the Northern District of California several years ago, decided that companies operating in other states were not compelled to secure local franchises. This latter decision was based on the Act of 1886.

Much satisfaction is being expressed by the authorities of several other cities in California, Pasadena in particular, because the Pacific company is at present operating over almost the entire state without franchises. Under the laws of the state of California, public service corporations are compelled by the terms of their franchises to pay a tax of 2 per cent on their gross earnings. No doubt this fact had a great deal to do with the fight of the telephone company to avoid being forced to secure a franchise.

Increase in Toll Rates by Salt Lake "Independent" Telephone Company.

An increase in the toll rates on the lines of the Independent Telephone Company, of Utah, control of which was purchased by R. L. Day & Co., last winter, between Ogden and Salt Lake, went into effect Sept. 2. Although there was no formal notice given subscribers of the change, instead of a 25-cent charge for a three-minute talk, as in the past, the charge hereafter will be 35 cents, or 1 cent a mile.

The *Herald*, of Salt Lake City, commenting on the change, says:

"It is claimed that this is the regulation charge throughout the country, and that the people of this territory have been enjoying a cheaper rate for toll service than in any other district of the country, since the Independent system has been established. The 25-cent rate was established by the Bell people who, it is said, will most likely retain it.

"Just why the Independent company has not seen fit to notify the people of its increase in tolls has not been made clear and it is uncertain as to how the people are going to take to the change. In return for the advance in toll charges the telephone company intends to quicken its toll service to such an extent that it will readily make up for the increased rate.

"The plan is that when the subscriber calls for 'toll' and, after getting the toll operator, gives her his call he will remain at the telephone the same as for a local call. The toll operator will connect direct with the local board in Salt Lake and give the call without the formality of going through the other toll operator's hands. It is claimed that this system will be as prompt as making a call through the local exchange, as the work on the toll operators will be less and they will be able to receive the calls much more quickly than under the present system."

Keystone Telephone Company's Annual Statement.

The statement of the Keystone Telephone Company, of Philadelphia, for the year ending June 30, 1908, shows the following earnings, expenses, and surplus:

Gross earnings		$1,051,071.56
Operating and maintenance charges including taxes and provision for doubtful accounts, etc		547,958.78
Net earnings		$ 503,112.78
Reserve for renewals	$100,000.00	
Interest charges	304,276.58	
		$ 404,276.58
Surplus		98,836.20

New Independent Company at Hillsboro, Ind.

Farmers and merchants at Hillsboro, Ind., have organized an Independent telephone company, and ordered a 100-drop switchboard and equipment for the immediate installation of an exchange system.

Service has been furnished to this town from the Bell exchange at Clinton, eight miles south. A recent raise in rates aroused a protest, which has resulted in the formation of the new company. The officers have announced their intention of establishing exchanges at Montezuma, Mecca and Rockville and of seeking a franchise to enter Clinton. The Independents were "frozen out" of Clinton some time ago, but are strong around Dana and Newport in this county. The Independents declare their intention of making a strong fight to establish lines all over Vermillion and Parke counties.

New Telephone Lines in California Forest Reserves.

Reports from Blue Lake, Cal., announce that Forest Supervisor F. H. Hafley has ordered the immediate construction of a telephone line from Peanut, along the county trail over South Fork mountain, to Mad river, with spurs to Picket mountain lookout, Cedar Camp ranger station and lookout on South Fork mountain.

The material is already on hand to extend the Hyampom line to Ranger, in Humboldt county. This extension will also take in two lookout stations.

Mr. Hafley states that there has already been 106 miles of telephone wire stretched, forming a part of the telephone system which will be used in the Trinity national forest. The main lines are from North Fork to Big Bar and Burnt Ranch; from Hyampom to a telephone station on North Mountain Power Company's line, 20 miles from Hyampom; and from Hay Fork to Peanut, Wildwood and Harrison Gulch. Spurs from these main lines are from Harrison Gulch line three miles to a lookout station on Mt. Dubakela; from Hay Fork to the summit of Hay Fork Bally; from Don Juan Point to the summit of Ironside mountain, and from the Hyampom line to Lake mountain.

There are at present 18 instruments in use on the system. No. 10 iron wire has been used in all construction work to date, but the two new lines upon which work is to begin will be still heavier.

Arrangements are being made so that work may be begun next summer on the construction of lines from Hay Fork to Weaverville, and from Minersville to Weaverville.

The intention of the forest bureau is to equip the forest so that lookouts from the mountain tops will all be supplied with telephones, in order that forest fires might be located and reported immediately. Emergency telephones will be installed so that travelers may also report fires.

The public will be greatly benefited by this network of telephones, for their free use will be permitted at the discretion of the forest supervisor.

In cases of severe illness, persons living in remote portions of the county find the forest lines a great convenience.

Central Union Alleged to Have Aided New Competitor with Independent Company at Seymour.

Reports from Seymour, Ind., indicate that when the Central Union Company (Bell) can gain in a particular locality by throwing over its alleged policy of promoting a one system service, it is quick to abandon the principle as applied to that section.

In the Indianapolis *News* of Sept. 3, appears the following item, relating to conditions at Seymour:

"The Seymour Mutual Telephone Company opened its exchange yesterday, ready for service after passing through a fight which began over two years ago.

"The Seymour Home Telephone Company, controlled by Louisville capitalists, operated the only telephone system in this city until recently. In December, 1905, the company sent out notices that the rates would be advanced 25 cents a telephone from Jan. 1, 1906. This made the residence telephones cost $1.50 and the business telephones $2.50 a month. The merchants of Seymour are strongly organized into associations, and they resented the increase in rates and notified the company that they would disconnect their telephones before paying that price. The telephone company was obdurate and stood its ground, with the result that the members of the association, including practically all the merchants, ordered their telephones removed. This phase of the fight continued for four weeks, during which time the business part of the city was without service. Finally an agreement was reached whereby the old subscribers were to have their telephones replaced at the former price, but any new subscriber must pay the advanced rate. By this plan a dual rate was established. This was unsatisfactory, but no trouble was anticipated, and it was thought that the matter was practically settled.

"Last December, however, the telephone patrons were notified that the prices of telephone materials had increased until it was necessary to make the rates uniform at the price asked two years previously. The patrons again rebelled, with the result that the Mutual Telephone Company was organized. Many of the business and professional men are stockholders. The Central Union Company aided the merchants in order to get control of the long-distance business.

The Home Telephone Company maintains its exchange here, with nearly 350 telephones connected, and has a large majority of the county lines, which places the Mutual at a great disadvantage. The new company, however, is wide awake and is making a strenuous effort to get control of the county lines, for if it fails it will be compelled to build lines sufficient to cover the county.

New Telephone System for Philadelphia Police Department.

The Electrical Bureau of the Philadelphia Department of Public Safety has just installed a complete telephone and signaling system by means of which the operators in City Hall or in the various police stations may call each other, and as many stations as they choose, when sending messages.

The director, superintendent and assistant superintendent of police can also talk to all or as many of the police stations as they desire to communicate with from their desks.

The operators in the police stations are the house sergeants. These have been provided with the head telephones and breast transmitters. Instead of writing on slates the messages or orders that are received, as was the rule when the old dial hand would slowly spell out the words telegraphed, the house sergeants now reproduce on typewriting machines what is sent them from the telephones.

Three copies of all messages must be thus written; one is kept at the station house, one is sent to the superintendent of police and the third to the electrical bureau. By this system are obtained both accuracy and dispatch. The time saved is fully 60 per cent as compared with the old way. Another value which this method has is that it gives the department permanent records. In order to simplify the work as much as possible, Mr. McLaughlin, chief of the bureau, has provided for typewriting machines with keyboards whose letters run in the regular alphabetical order. He explains that police business should be as quickly learned as possible, and to this end he wants no stumbling block placed in the men's way.

Illinois Central Railroad Completes Telephone Line.

The Illinois Central Railroad has just completed the stringing of two new telephone wires between Memphis and Louisville, Ky., and telephone instruments will be installed at once at every important station between the two cities. The Illinois Central already has a complete private telephone system in operation between Chicago, Memphis and New Orleans, and this new link will practically complete the system on all the Southern lines.

Two lines of copper wire were installed between Memphis and Louisville over a year ago, but at that time the demands for wire service were so heavy that the telephone instruments were not installed. Instead, one of the wires was used as a telegraph wire and the other was placed in service for handling the manual block signal system on that section of the road.

For the past four or five years most of the larger cities on the system have been connected by a private telephone system, but this has been used altogether by officials of the system, all train dispatching being done by telegraph. It is probable that, when the instruments are installed at all stations, some of the work of dispatching will be done by telephone.

Dubuque City Council to Investigate Telephone Rates.

Last week the city council of Dubuque, Iowa, where the Bell telephone company recently acquired control of a competing Independent company, passed the following resolution:

Whereas, complaints have been made and they have accumulated about the manner in which the Iowa Telephone Company has been conducting its business with our citizens, and

Whereas, the methods adopted by said company to compel subscribers to put in a higher priced service than they thought they could afford appear unfair, for instance, telephones of retail houses have been placed on the same line with private houses where the owner did not wish to pay for higher priced service, with the result that the telephone would be ringing continuously, the evident intent being to cause annoyance, and

Whereas, said company has apparently advanced the rates for both private and business service, and

Whereas, our streets have been torn up by this company and often not replaced properly, our streets and alleys look like forests, its wires prevent speedy work where the same is most necessary—that is, in case of fire—it has by the purchase of a lot taken valuable property off the tax list, it is given fire and police protection, the street is sprinkled, swept and cleaned in front of its property, and this company, demanding more attention and occupying more of the public streets and alleys than any other corporation in the city, pays for the protection of its property and all other benefits conferred by the city of Dubuque the insignificant sum of $98 per annum; therefore,

Resolved, by the city council of the city of Dubuque, that the city attorney be and he is hereby directed to prepare as expeditiously as possible an opinion and present the same to the city council, as to whether or not the city has any control, police regulations or otherwise over said company.

Telephone Service Interrupted by a Plumber.

A plumber with a hammer, a chisel and a contempt for electricity punctured three telephone cables of the Home Telephone Company in Utica, N. Y., Sept. 1, and put about 500 telephones out of business for two days. The plumber was engaged in putting in gas pipes under one of the streets in the city when he ran across the telephone cables. Three cables were punctured before he got the gas pipes through. The telephone company was at a loss to account for the sudden trouble on so many lines. An investigation was made and the trouble traced to where the plumber was at work, unconscious that he was the cause of any trouble. Most of the telephones affected were located in the residential part of the city, but a number of business telephones were also in trouble.

The telephone company promptly set to work to repair the trouble, working all night splicing the cables and testing out the line, so that the subscribers were not greatly inconvenienced.

A New Missouri District Organization.

A new district organization was perfected in The Missouri Independent Telephone Association, at Springfield, Mo., last Friday, Sept. 4. It is what is known as the Eighth District and comprises the exchanges in the counties in the vicinity of Springfield.

Nearly thirty telephone men were present at the Metropolitan Hotel and, in the morning session, selected temporary officers and discussed the necessity and advisability of an Independent telephone association.

A constitution and by-laws, similar to those issued in other districts, was read by the traveling secretary, W. R. Barkdull, of Windsor, and a committee of five was appointed to revise or draft new by-laws for adoption at this convention. These were presented and adopted during the afternoon, at which session the following officers were elected for the ensuing year:

President, W. C. Faubion, Lebanon; vice-president, J. C. McKee, Boliver; secretary and treasurer, A. K. Kirkland, Ash Grove; executive committee, S. K. Jackson, Cabool; E. E. Noe, Richland, and W. M. Franklin, Aldrich, these to act together with the other officers.

At the afternoon session the following program was carried out, and general discussion was given each subject after the paper was read.

"Why Should We Have Association Meetings?" by W. R. Barkdull, traveling secretary, of Windsor; "Economy and Savings in an Exchange," by D. C. Clark, of Lockwood; "Rural Service—How I Handle It," by A. K. Kirkland, Ash Grove; "Faults and How Remedied," handled by A. F. Adams, of Joplin; "Can We Afford Free Connections?" by W. C. Faubion, of Lebanon; "Standardization and Good Equipment," by T. L. Dunlap, of Springfield; "Business Methods in the Telephone Business," by J. C. McKee, of Bolivar; "Mutual Exchange Service—Is It a Permanent Fixture With Us?" by J. N. B. Shelton, of Mt. Vernon; "Service and Its Secrets" was taken by Ed. A. Hook, of Appleton City.

President Faubion invited the association to Lebanon for the next meeting, and it was left with the executive committee to decide. All felt it to be an excellent meeting.

California Independents to Meet at Long Beach.

What promises to be the banner meeting of the California Independent Telephone Association will be held at Long Beach, Cal., Saturday, Sept. 26.

The delegates will be met at the Huntington Bldg., Los Angeles, by the private car of D. M. Linnard, of the Hotel Virginia, Long Beach, and taken to the beach, where they will be the guests of the Vita Mfg. Co., which has arranged the entire entertainment for the day. The business session will be held about 6 p. m., after which a banquet will be served at the Virginia.

Among the items of entertainment will be a launch ride around the bay, a visit to the Graig shipbuilding plant, bathing, vaudeville, the Pike and numerous other novelties arranged for the especial benefit of the telephone men. Heretofore the meetings have been for the men only, but this time the ladies are to be taken along and consequently a royal good time is in store.

The program has not been entirely arranged, but Secretary Wardman promises that this part of the affair will not be the least enjoyable, and when Wardman promises it is a sure thing he will "make good."

New Telephone Lines in Mexico.

Mexico is coming to the front as a telephone-using country, and several important projects are now well under way, the latest to be announced is an important line at Durango. A new telephone line between that city and Gabriel has already been completed. This now gives direct communication between Durango and all the leading haciendas and large mining camps in that section.

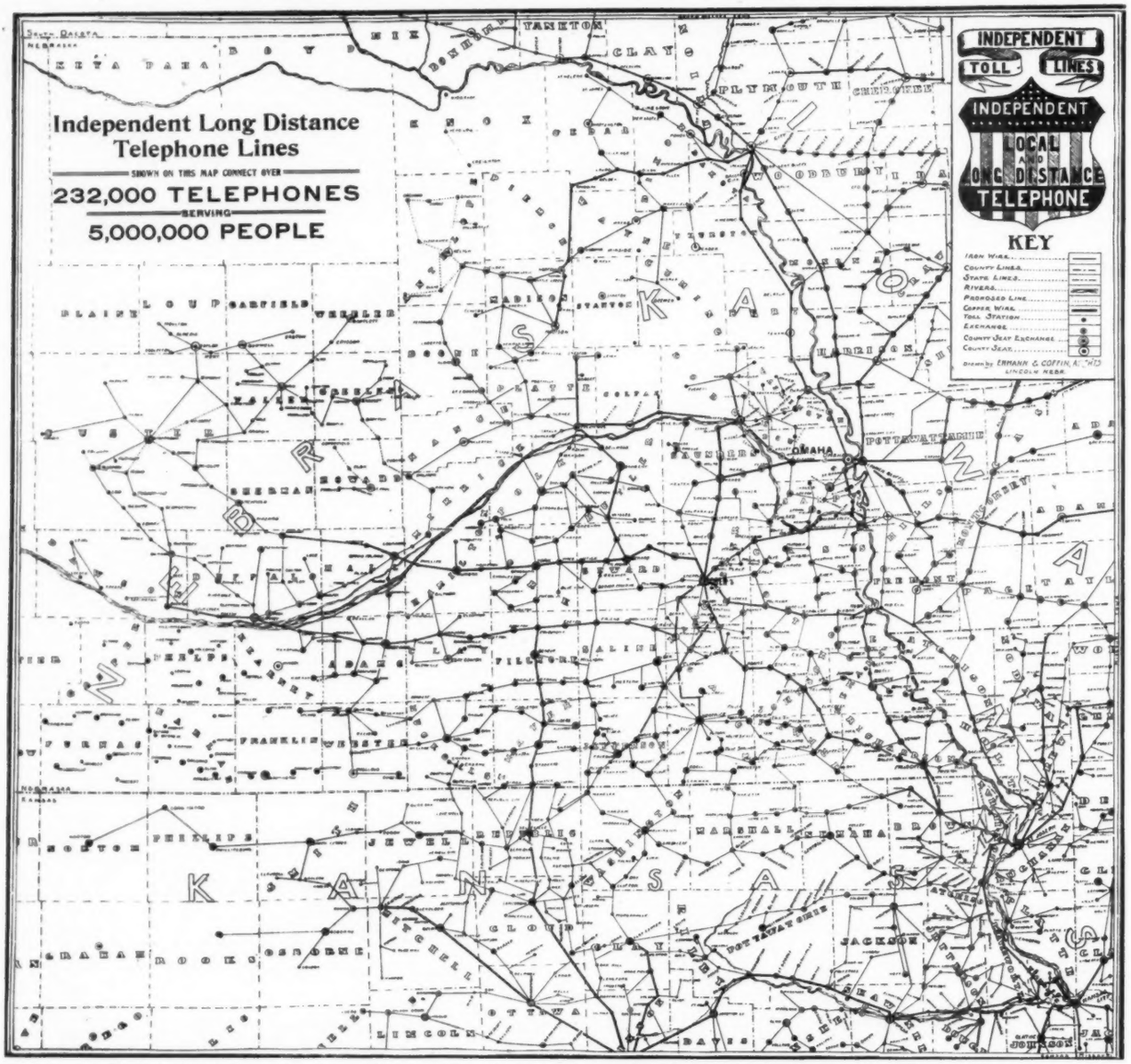
Pueblo Nuevo, a large mining district west of Durango, is now endeavoring to establish a telephone system from that point to Chavaria, a town some fifty kilometers distant, where there is a Federal telegraph office. This will put it in direct communication with Durango.

If this proposed line is established it will then make all the leading ranch villages connect with each other.

Nebraska's Extensive Independent Toll Line System.

In Nebraska they have been going out and building Independent toll lines when and where they were most needed for some years. The work has been well planned, and once a line is built it is able to carry the business for the local exchanges which have grown so rapidly, and give good service.

The extent and completeness of the Nebraska Independent toll line system is evident from a glance at the accompany



Map of the Independent Long Distance Toll Lines in Nebraska Showing Connections with Adjacent States.

ing map, one of the most creditable results of the many valuable and successful efforts to build up the Independent telephone business made by the Telephone Traffic Association, of which Mr. R. E. Mattison is secretary.

Texans Organize Independent Company When Telephone Rates are Raised.

One hundred and fifty indignant citizens at Kaufman, Texas, have ordered the telephones of the Southwestern Telegraph & Telephone Company (Bell) removed because the rates were increased. The citizens will organize an Independent company.

Michigan Central Railroad Decides to Adopt Telephone for Dispatching.

The Michigan Central Railroad is making plans for the installation of the system comes after careful investigation by adoption of the telephone comes after careful investigation by the officials of the company, and work on a private telephone line for train dispatching between Jackson and Detroit has begun. The pole and wire system already in service for telegraphic use is being overhauled and added to, and the switchboard and telephone equipment ordered.

The divisions of the Michigan Central for the first installation of the telephone system are Detroit and Jackson, Detroit and Bay City, and Detroit and Toledo. The telegraph will be entirely discarded on these roads in train dispatching and the telephones exclusively used.

As a rule the train dispatcher will use the telephone direct, although there will be aides if necessary to repeat the written orders. All orders will be in writing at both ends of lines,

so there can be no question as to what is said or heard. In each station there will be a large gong instead of the usual small call bell, and anyone can answer and call the employee who should receive the order.

It is said that it is only a matter of time before the entire Michigan Central system will be equipped with telephone dispatching circuits.

Outing of Employees of the Pittsburgh & Alleghany Telephone Company.

The employees of the Pittsburgh & Alleghany Telephone Company held their annual outing on Saturday afternoon, Aug. 29. About 500 were taken by the steamer Island Queen up the river to Rochester, where a short stop was made before returning. There was an orchestra aboard the boat and dancing was enjoyed by everyone. The outing was voted a great success. The following were members of the various committees: N. W. Brooker, Jr., J. H. Wolfe, C. F. Bender, Frank Hart, Charles A. Gabig, T. G. Davis, L. P. Schneider, H. E. Webb, W. M. Stonebraker, L. Mühlheizler, F. M. Weaver, A. L. McCorkle, E. W. Hatfield, F. J. Heavens. The interests of the party were also looked after by a ladies committee with an ample list of members.

New Independent Exchange at Fairbury, Neb.

Last week the Fairbury Independent Telephone Company began to give service from its new exchange, in its own building. About $10,000 has been expended to provide central office equipment of the best modern type, and a high grade outside plant. The multiple board is arranged to accommodate 2,200 subscribers.

Telephone Patents

TWO-WIRE TELEPHONE CIRCUIT.

Alfred H. Weiss, Chicago, Ill., patent 897,042, Aug. 25, 1908.

A two-wire common battery multiple switchboard circuit, doing away with the normally open contacts in the line circuit, which are ordinarily present through the use of cut-off relays, is covered by this invention. The line conductors are permanently connected between one of the line conductors and a third conductor, and therefore out of the path of calling circuit from the subscriber's station. This relay winding controls the local signal circuit.

In connection with the cord circuit, the central battery is connected between the third conductor and one strand of the cord circuit. The battery furnishes the talking current to the line through the relay windings.

TELEPHONE SYSTEM.

H. G. Webster, Chicago, Ill., patent 897,243, Aug. 25, 1908.

This invention comprises a relay at the central station for connection with central energy systems, the armature of which is capable of occupying three operative positions, one position serving to connect the line lamp, and in its further attracted position to disconnect the line lamp. The operation of the relay in this case is effected by having two batteries of unlike voltage, the weaker battery causing a part energization of the relay, this causing the armature to occupy one of its positions, and the stronger battery serving, when the plug is inserted in the jack, to cause the armature to occupy a further attracted position extinguishing the lamp.

TELEPHONE SYSTEM.

H. G. Webster, Chicago, Ill., patent 897,242, Aug. 25, 1908.

Common battery central office telephone circuit arrangements are described in this patent. The windings of the line and cut-off relays are disconnected from the line circuit when a ringing current is sent over the line.

The invention likewise uses the double-acting relay, which is designed to occupy three operative positions for controlling the line lamp.

TELEPHONE REPEATING APPARATUS.

H. E. Shreeve, Newton, Mass., patent 897,028, Aug. 25, 1908.

This invention refers to a telephone repeating apparatus as used in the cord circuit. A third winding is inductively associated with the two repeating coils' primary windings. The third winding is connected with a receiver, which actuates a transmitter. This transmitter is connected with a battery to amplify the talking currents passing through the cord circuit and re-impresses them on the two conductors of the cord circuit, through the interposition of repeating coils.

The invention further provides means whereby the third winding, in association with the first repeating coil, has an adustable resistance included in its circuit, so that a number of lines having different electrical properties can be successively interconnected through the agency of the particular cord circuit and the hum which is ordinarily occasioned when a connected transmitter and receiver are used is thereby avoided.

RELAY FOR TELEPHONE SYSTEM.

H. G. Webster, Chicago, Ill., patent 897,235, Aug. 25, 1908.

This patent, similar to previous ones granted Mr. Webster, covers a telephone relay which serves the double purpose of line and disconnect relays, and is adapted to occupy three operative positions. It comprises a signal receiving electromagnet at the central office, having a winding of low energizing capacity, normally in the line circuit, and with a suitable source of current, so that a limited energization only of the electromagnet may be controlled by the subscriber to cause an operation of the line signal.

The relay also has two other windings, which have greater energizing capacities, and which are adapted, through the agency of the cord circuit, to receive currents effecting a greater energization of the relay to extinguish the line lamp. The second energization overcomes the energization due to the subscriber's previous operation, and the relay is further provided with springs which when actuated remove the winding of greater energizing capacity from the direct circuit extending between the substation and the jack, and also to include in a branch circuit the other winding of greater energizing capacity.

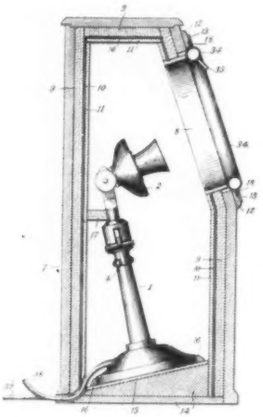
PORTABLE BOX FOR HOLDING DESK TELEPHONES.

O. H. Goodrich, Castleton Corners, N. Y., patent 897,084, Aug. 25, 1908.

This invention relates to a containing box, which is so constructed as to prevent sounds from passing through its walls, and is adapted to contain a desk telephone, 1, which has its outside connections through the cords 37 and 38, and which is held by the bar 17. The box 7 has but one opening, 8, through which sounds can pass, this opening is provided at its exterior periphery with a pneumatic ring, 34, which can be blown up through the nozzle 35.

The desk telephone may be moved around bodily, and the user of the desk telephone can communicate with another

party without his conversation being heard by those in the same room from which the conversation is being carried on. The user places his face against the pneumatic ring 34, which



is of such construction that it encloses his mouth and nose, and as the box 7 is sound proof the sounds from his conversation will not be heard in the same room in which he is talking.

TELEPHONE SYSTEM.

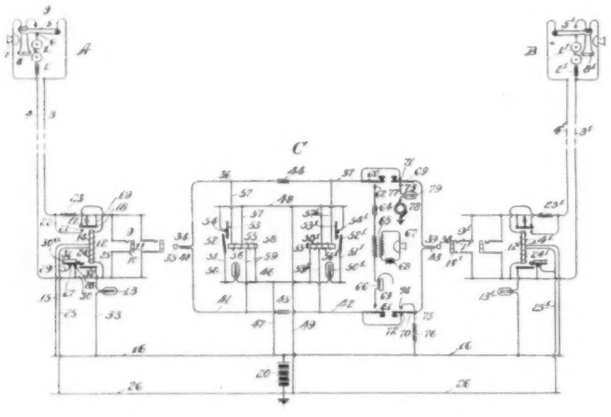
H. G. Webster, Chicago, Ill., patent 897,240, Aug. 25, 1908.

The telephone system covered by this patent is similar to those elsewhere described, except that impedance coils are used to furnish current to the line wires, and the repeating coil windings are both inductively associated with a relay core, which serves to connect and disconnect the line lamp from the circuit.

TELEPHONE SYSTEM.

H. G. Webster, Chicago, Ill., patent 897,237, Aug. 25, 1908.

This patent relates to a common battery telephone system, and uses the controlling relay of the so-called double-acting



type, adapted to cause the display of the line signal in response to a given energization, and to efface the signal in response to a greater energization. The relay 12, is provided with two armatures, 17 and 32, and two windings, 14 and 24. When the plug is inserted in the jack, armature 32 is attracted a greater distance than merely to bring it into contact with the spring 30-*a*, thereby disconnecting the line lamp 32 and at the same time excluding the resistance 23 from the talking circuit.

RELAY FOR TELEPHONE SYSTEM.

Harry G. Webster, Chicago, Ill., patent 897,234, Aug. 25, 1908.

This invention is similar to the ones elsewhere described and is more especially applicable to the line relay which serves the double purposes of line and cut-off relays, the line relay being provided with a winding which has a third terminal taken off the middle of the winding. By means of this third terminal the relay winding can be partially energized by the subscriber removing his receiver, thus lighting the line lamp, The relay, then being further energized by the insertion of the plug occupies its third position, extinguishing the line lamp.

TELEPHONE SYSTEM.

H. G. Webster, Chicago, Ill., patent 897,236, Aug. 25, 1908.

A relay for common battery telephone systems similar to the one described in patent 897,232, in that a relay is used, the armature of which is adapted to occupy three positions, is covered by this patent. The relay described has two armatures, one being capable of attraction through a limited energization of the relay, and the other requiring a stronger energization.

The relay serves the same purpose as those previously described, namely, to connect the line lamp when the subscriber lifts the receiver, and to disconnect the line lamp when the plug is inserted in the jack.

TELEPHONE EXCHANGE SYSTEM.

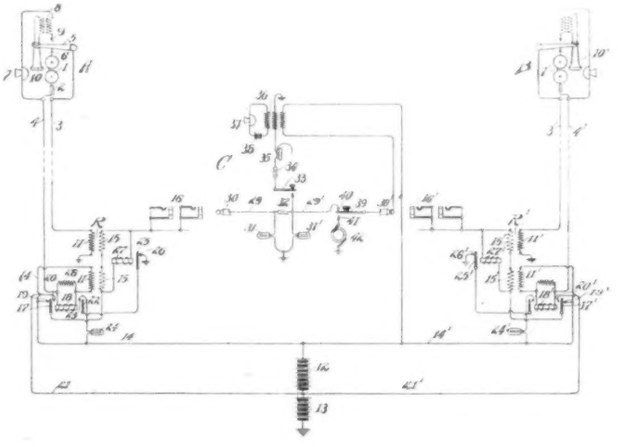
Harry G. Webster, Chicago, Ill., patent 897,233, Aug. 25, 1908.

This patent, similar to patent 897,232, provides a new form of relay, which is adapted to perform both the connection and disconnection of the line lamp, being so arranged that it can occupy three different positions. The relay has two windings, one providing a limited magnetization of the relay, causing the armature to occupy one position, and the other winding producing an enhanced magnetization of the relay, causing it to occupy its third operative position, thus disconnecting the line lamp.

TELEPHONE SYSTEM.

H. G. Webster, Chicago, Ill., patent 897,241, Aug. 25, 1908.

This invention likewise uses repeating coils to connect the line wires to the spring jack. The new features comprise supervisory lamps directly included in the cord circuit connec-



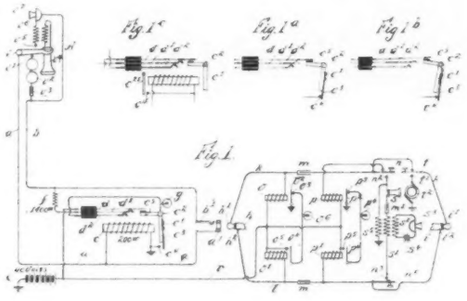
tion, and these lamps do not injuriously influence the talking, as they have no impedance. The impedance of the cord circuit is further reduced by having the repeating coil windings of very low resistance. The operation of the system will be readily apparent from the illustration.

COMMON BATTERY TELEPHONE SYSTEM.

Harry G. Webster, Chicago, Ill., patent 897,232, Aug. 25, 1908.

The telephone system described consists of a novel form of signal controlling electro-magnet, which is under the control of the subscriber, and also under further control of the operator at the central station. This magnet is so designed that it can

occupy three different operative positions, which are shown in Figs. 1*c*, 1*a*, and 1*b*. Fig. 1*c* shows the relay in its normal position; Fig. 1*a* in its partially attracted position, as when the subscriber has removed his receiver, and Fig. 1*b* shows the position when the operator has plugged into the jack to restore the line signal.

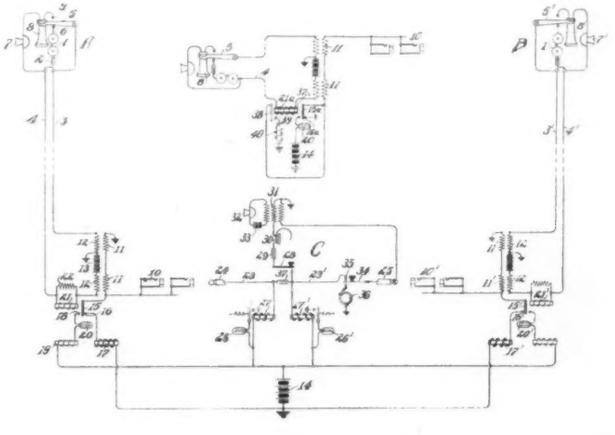


A second form of the magnet arrangement is shown in Fig. 1, where the relay has but one winding. It will be noted that a 1400 ohm resistance coil is in series with one of the jack springs, and is thereby placed in series with the relay *c* when the subscriber removes his receiver. This gives the relay a limited magnetization, but, when the plug is inserted in the jack, current is supplied to relay *c* through one of the clearing-out relays, whose resistance is very much less than 1400 ohms, and thus the relay receives an increased magnetization, which causes it to occupy its third position, in which it disconnects the line signal *g*.

TELEPHONE SYSTEM.

H. G. Webster, Chicago, Ill., patent 897,238, Aug. 25, 1908.

This invention relates to a telephone system whereby the line circuit is connected through a repeating coil to the jacks in the central office. The repeating coil windings are employed, not only in the performance of the usual transmitting functions, but also in control of the usual line and supervisory signals. In the illustration, the subscriber's set is shown at

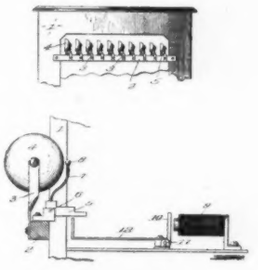


A, and through the agency of the line wires 3 and 4, is connected to the jack 10, through the interposition repeating coil having windings 12-12 and 11-11. A resistance, 18, in connection with the cord circuit and the windings 11-11 of the repeating coil causes the line lamp 20 to be extinguished. The resistance 17 is used to extinguish the clearing-out lamp when the receiver is replaced on the hook.

MAGNETO TELEPHONE SIGNAL.

Chas. Mahler, New York, N. Y., patent 897,119, Aug. 25, 1908.

This patent is designed to provide an improvement over the ordinary magneto ringers for switchboards. There are gongs of different sizes, so that each line can be easily distinguished by the operator. The construction comprises a gong, 4, for each line, and an actuating relay 9 which takes the place of the ordinary drop or ringer coils used in the switchboard. This



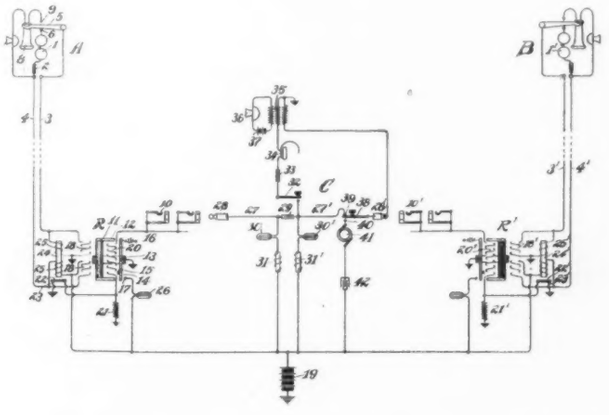
relay 9 actuates the armature 10, thereby operating the arm 12, which, through the agency of the horizontal extension 5, operates the striker 8 to strike the gong 4. The gongs 4 for the various lines are of different sizes.

TELEPHONE SYSTEM.

H. G. Webster, Chicago, Ill., patent 897,239, Aug. 25, 1908.

This is similar to the one described in patent 897,238, except that the repeating coil windings are mounted upon a relay core, the armature of which operates the line and clearing-out lamps.

In the operation of the system, a party at substation A desiring to converse with a party at substation B removes the receiver, and thereby closes the circuit through the repeating coil windings 18. At the same time a circuit is completed through the sections of the winding 25, of the control relay, so that relay *R* and controlled relay 24 attract their armatures. This causes the line signal 26 to operate. The act of inserting the plug closes the circuit from the battery 19, through impedance 21, supervisory lamp 30, plug 24, jack 10, repeating coil winding 20, and resistance 21. This current, however, is not sufficient to operate supervisory lamp 30. The operator then inserts the calling plug, after having ascertained the connection desired, thereby closing circuit through the battery 19, condenser 42, calling generator 41, ringing contacts 40-38, jack



10, winding 20, and repeating coil *R*. By reason of the exclusion of the resistance 21, the flow of current through the lamp 30 will be sufficient to cause its illuminating and it will remain so until the call is answered at the substation *B*.

TELEPHONE SPRING JACK.

G. Grabe, Wilmersdorf, Germany, patent 897,085, Aug. 25, 1908.

This patent covers a spring jack, in which a long strip of hard rubber or similar material is grooved its full length and provided with offsets at its front and rear edge. The rear edge supports the jack springs, and the drilled front offsets support

the thimble. The rear of the rubber is circularly drilled to suitably hold the springs. Stops are provided to maintain the springs in their normal position.

TELEPHONE SIGNALING DEVICE.

Thos W. Gardner, Nashville, Tenn., patent 897,731, Sept. 1, 1908.

A busy test system for common battery telephone exchanges is covered by this patent. It provides means whereby in such systems the cord circuits, having condensers inserted in the cord strands, are supplied with satisfactory means for effecting a busy test. The operator's receiver has a condenser in series with it, which is maintained in a permanently charged condition. A repeating coil is connected with a differential relay which serves to operate the line relay. The differential relay is connected to the battery and serves to keep the condenser associated with the operator's set in a charged condition. The circuit connections are such that the plug tip is of a different battery polarity from the jack thimble.

Condensed News Reports

Officers of companies are earnestly requested to forward us promptly all financial and other statements as soon as issued and any items of interest as to their plants and systems

PERSONAL.

MR. R. S. KRANBUEL has been elected manager of the Blue Springs Telephone Company of Blue Springs, Neb.

MR. JOHN R. GUNN, formerly of Clinton, Mo., has bought a majority of the stock of the Warsaw Telephone Company of Warsaw, Mo., giving Texas land in exchange.

MR. P. J. FITZGERALD, formerly superintendent of construction, has succeeded H. M. Keys, resigned, as local superintendent of the plant for the Home Telephone Company at Albany, N. Y.

MR. H. J. OVERTURF has been appointed treasurer and manager of the Pioneer Telephone & Telegraph Company of Bend, Ore. He succeeds H. C. Ellis and W. F. King, manager and treasurer respectively, who recently resigned.

MR. C. B. LUCK, formerly division superintendent of the Pioneer Telephone Company, with offices in Oklahoma City, Okla., has been appointed manager of the Fort Worth Telephone Company of Fort Worth, Tex. Mr. Luck succeeds John W. Clifton, superintendent of the company, who has been acting manager since the resignation of Lloyd E. Knapp.

NEW COMPANIES.

MODESTO, CAL.—Articles of incorporation have been filed for the Sylvan Rural Telephone Company for a term of 50 years by Attorney L. L. Dennett. The capial stock is $10,000.

MALAD CITY, IDA.—Articles of incorporation have been filed with the secretary of state for the Curlew Telephone Company of Malad City, with a capital stock of $5,000. Incorporators: Ephriam Briggs, Helen A. Holbrook, Robert Sweeten, W. C. Hill, Seth Thomas.

QUINCY, ILL.—Artices of incorporation of the Fall Creek & Payson Telephone Company have been filed for record with the county recorder. According to the statement, C. F. Reinebach, W. H. Watson and John G. Thompson are named as commissioners, and the capital stock is given as $1,380. The purpose of the company is to do a general telephone business between Fall Creek and Payson, and the duration of the corporation is to be 99 years, with the head office located at Fall Creek.

URBANA, ILL.—The incorporation papers of the Somer Township Telephone Company have been filed with the county recorder. The incorporators are O. B. Flatt, M. C. Busey, P. P. Dunn, Fred Shroyer, Martin Brownfield and William Schiff. The capital stock is $8,000, all paid up. The company schedules property valued at $11,857. The directors for one year are O. B. Flatt, Fred Shroyer and William Schiff; for two years, George Bassett, Peter Arie and G. M. Kirby; for three years, M. C. Busey, Martin Brownfield and P. A. Donaldson.

BROWNSTOWN, IND.—The farmers of Washington and Grassy Fork townships held a meeting recently to consider organizing a telephone company, and it is probable that further steps will be taken in the near future.

MOSCOW, IA.—The Moscow & Wilton Rural Telephone Company has been formed, and the articles of incorporation filed with the county recorder. The line will reach several of the farms between the two towns. The officers chosen to serve until the annual meeting in June are A. R. Rexroth, president; Benj. Lang, vice-president; Harry H. Will, secretary, and Henry Hahn, treasurer. The board of directors is composed of the officers and the following additional members: John Teufel, John A. Hahn and John Brown.

WHITEWATER, KAS.—The Whitewater Telephone Company has been incorporated here with a capital stock of $10,000, and will soon proceed to build lines.

EUBANK, KY.—The Eubank & Bethelridge Telephone Company, Pulaski county, has been incorporated with a capital stock of $1,200. Incorporators: T. J. Acton, Rebecca V. Acton, Silas Wesley and others.

FRANKFORT, KY.—The Kings Mountain Farmers' Telephone Company, Lincoln county, has been incorporated with a capital stock of $5,620. The incorporators are J. W. Acton, J. H. Acton, J. T. Brown, J. H. Carter and others.

MANDRAKE, KY.—The Mandrake Telephone Company has been organized here with a capital stock of $1,000. The organizers are James M. Fields, Jr., Mathew Fields, Robert Fields and Henry Fields, Sr., all of Mandrake. An eighteen mile line will be built from Mandrake to Line Fork and Hurricane Gap. Mathew Fields is manager.

COPEMISH, MICH.—The Mutual Telephone Company has filed articles of incorporation with a capital stock of $10,000. The company will construct and operate several telephone lines.

PLUMMER, MINN.—The Clearwater Telephone Company has filed articles of incorporation. The capital stock is $10,000 and the incorporators are: Olaf Tande, J. W. Lynch, Henry J. Enderle and others.

PLATTSBURG, MISS.—The Plattsburg Telephone Company has been incorporated here with a capital stock of $10,000. The incorporators are H. M. Woodall, J. L. Lee and others.

DESLODGE, MO.—The Lead Belt Telephone Company has been incorporated here with a capital stock of $20,000. The incorporators are A. C. Mackley, J. L. Goff, W. P. Giessing and others.

EAGLE MILLS, N. Y.—The Forest Park Telephone Company has been organized here, and is building a line to connect with the Commercial Union Company here.

BOWMAN, N. D.—The Northern Telephone Company has been incorporated here. The incorporators are A. K. Gordon, Charles Paulson and J. P. Rodgers, all of Bowman.

MEDINA, N. D.—The Central Telephone Company is being organized here with a capital stock of $100,000 by W. J. Dwyer and others. The new company will take over all lines now operated by Mr. Dwyer, and several new lines in this vicinity. The officers of the new company are W. J. Dwyer, president; M. C. Dwyer, vice-president; Katherine Dwyer, secretary.

COWLINGTON, OKLA.—Articles of incorporation have been filed for the Cowlington & Spiro Independent Telephone Company. W. E. McGowan is interested in the new company.

ALDEN, PA.—Articles of incorporation have been filed for the A. B. & C. Telephone Company, which will be capitalized at $10,000.

JOHNSTOWN, PA.—Application will shortly be made for a charter for a new telephone company which proposes to build a line connecting Wilmore with Elton, Beaverdale, Sumnerhill and other towns in that immediate vicinity. The company, which has already several hundred subscribers, will be capitalized at $5,000. The officers of the new company are as follows: President, Lyman Sherbine; secretary, S. W. Crum; treasurer, C. T. Settlemeyer.

LOCK HAVEN, PA.—A rural telephone company was recently organized under the name of the Mill Hall & Mittany Telephone Company. The rural lines between Mill Hall and Lamar are under control of the new company and later lines will be built to Loganton and other points. The officers of the company are: President, H. M. Snyder, Clintondale; vice-president, D. C. Grieb, Lamar; secretary, M. G. Goffey, Mill Hall, and treasurer, C. H. Long, Lock Haven.

MIFFLINTOWN, PA.—Application will be made by H. J. Shallenberger, J. B. Carney, J. O. Smith, J. H. Shallenberger and A. J. Beyers for the charter of an intended corporation to be called the "Lost Creek Valley Rural Telephone Company," the object of which is the constructing, maintaining, leasing and operating telephone lines within the counties of Juniata, Snyder and Perry.

PORTERVILLE, PA.—The Porterville Telephone Company, Crawford county, has been incorporated with a capital stock of $12,000.

CELINA, TENN.—The Home Telephone Company of Celina has been incorporated here by E. Kirkpatrick, W. F. Brown, H. H. Shyle, C. R. Wills and W. H. Kirkpatrick.

TRENTON, TENN.—A company of citizens of Eaton, and several of this city, has been organized and is preparing to put in a telephone line. All stock has been subscribed. A number of country lines have been discontinued by the Cumberland company here, hence home lines are being put in.

CANADIAN, TEX.—The Canadian Long Distance Telephone Company, Hemphill county, has been incorporated with a capital stock of $10,000. The incorporators are A. M. Newman, H. E. Hoover and O. R. Newman.

MARLIN, TEX.—A local company is being formed to construct a line of telephone communication to important points near Marlin, including the country club grounds, the hard wood saw mill near High Bank, and the Clark plantation.

SNOWVILLE, UTAH.—Bishop J. C. Cutler, of this place, is interested in the organization of a telephone company to build lines to Brigham and other points.

SPOTTSYLVANIA, VA.—William Thorburn, a farmer of Chancellor District, this county, and several other residents, are engaged in a movement lookinging to the building of a new telephone line in this county to run from Fredericksburg, Va., and along the Orange and Chancellor pike by way of the Wilderness and Chancellorsville battlefields to Lignum and Culpeper City. Enough capital stock has been subscribed to begin the work, which will commence as soon as the company is organized and a board of directors chosen.

WENATCHEE, WASH.—The Stemilt Hill Telephone Company nas been incorporated here with a capital stock of $2,000. The incorporators are A. L. McMullen, O. Ollenbaugh and Henry Will.

MELLIN, W. VA.—The Citizens' Telephone Company has been organized here.

OCONTO FALLS, WIS.—An Independent telephone company is being organized here to operate a line between Oconto Falls and Sampson. Preliminary work is being hurried as much as possible and the new line soon will be in operation.

TWO CREEKS, WIS.—Farmers of this town have organized a company to build a telephone line connecting with the exchange of the Two Rivers Telephone Company at Two Rivers.

ESTEVAN, SASK., CAN.—Farmers living south of this city are organizing a rural telephone system which will be in operation this fall and will have connection with this town by a government line. At the outset 11 miles of line will be built and extensions made as business requires. Address W. C. Howland or Malcolm Nicholson.

FINANCIAL.

CLAYTON, ILL.—The Clayton Farmers' Union Telephone Company will hold a meeting of directors and stockholders Sept. 12 for the purpose of increasing the capital stock of the company from $1,000 to $2,500.

COUNCIL BLUFFS, IA.—The Independent Telephone Company is offering for sale $8,000 of its preferred stock in $100 shares. The money is to be used in new construction.

LEBANON, MO.—The Ozark Telephone Comapny of Lebanon has filed a statement to show that it has made an increase in its capital stock from $16,000 to $25,000.

WAHOO, NEB.—The Golden Rod Telephone Company has been reorganized and the capital stock increased from $100,000 to $140,000.

EDMONDS, WASH.—The Edmonds Independent Telephone Company has filed a certificate of increase of capital stock from $2,500 to $7,500.

DODGEVILLE, WIS.—The Dodgeville & Northern Telephone Company has increased its capital stock from $1,200 to $2,000. The additional issue is to provide funds for extensions and improvements.

STRATHCONA, ALB., CAN.—The National Trust Co., Toronto, has purchased $15,000 municipal telephone 5 per cent bonds at 95.56 and accrued interest.

WINNIPEG, MAN., CAN.—The Occidental Fire Insurance Co., Brandon, Man., has purchased $55,000 government telephone bonds at 98.5. Hon. J. H. Agnew has left for Eastern Canada to interest financial houses in the disposal of the remaining $345,000 of government telephone bonds.

FRANCHISES.

AURORA, IND.—A communication from the Southern Indiana Telephone Company, by E. W. Swarthout, manager, asking for a franchise within the city limits, has been referred to the committee on franchises.

ST. PETER, MINN.—The granting of a new franchise to the Nicollet Telephone Company is being considered by the city council.

HARRISBURG, PA.—The American Union Telephone Company of this city has been granted a franchise to construct, operate and maintain a telephone system in the borough of Clymer, Indiana county.

LEESBURG, VA.—The city will receive bids until Sept. 11 for the telephone franchise. W. E. Garrett is mayor of the city.

DEER PARK, WASH.—The application of F. L. Buell of Deer Park to erect a telephone line and maintain it will be heard by the Spokane county commissioners Sept. 11. The proposed line will start at the north quarter corner of section 23, township 28, range 42, and run along the Dalton road to the Wild Rose road, and thence west along this road to the boundary of Spokane and Stevens counties. The franchise also seeks a line beginning at the north quarter of section 2, township 27, range 42, running southeasterly along the Austin and Ridgeway roads.

CHATHAM, ONT., CAN.—The Bell franchise expires this year and the Blenheim & South Harwick Company is ready to enter the city with an underground system and reduce the present Bell rates by $10 per telephone. The Bell company phys the city $400 per annum under the expiring franchise.

CONSTRUCTION.

ATHENS, ALA.—A new telephone line has been completed to Elkmont and another has recently been opened for service to Cross Keys. T. M. Coxe is building a line from this place to Pettey.

BIRMINGHAM, ALA.—T. T. Ashford, of Birmingham, is building an Independent telephone line from Swancott to Mooreville, a distance of about twelve miles.

TUCSON, ARIZ.—C. W. Hinchcliffe, general manager of the Arizona Telephone Company, is making arrangements for new quarters for the company's exchange in Mesa. A new switchboard will be installed and many extensions and improvements made.

COTTER, ARK.—A telephone line is being built from this place to Batesville by Edward Farris. The line begins at the Mountain Home-Cotter line at Gassville, thence to Haney, where it crosses White river and thence to Lone Rock, touching every important point between Mountain Home and Batesville.

MONTICELLO, ARK.—The Valley Telephone Company will at once install a new copper-wire circuit between Warren, Monticello and Dermott, and a number of other improvements are projected.

SACRAMENTO, CAL.—A telephone line is being constructed between Grizzly Flat and Placerville. The line also connects with Newton and will in time include Fairplay, Somerset and other points.

NEW HAVEN, CONN.—The installation of new telephone apparatus for the police department has been completed.

GOLDEN, ILL.—The Illinois Western Telephone Company of Macomb is rebuilding its system here and installing many improvements.

LERNA, ILL.—The Lerna Mutual Telephone Company has ordered a new switchboard for its Trilla exchange, and will make many improvements and extensions in this vicinity.

ROCKFORD, ILL.—The Winnebago County Telephone Company is putting up a toll line from Rockford to Durand. This will be much shorter than the present route by way of Rockton.

ANDERSON, IND.—The Delaware and Madison Counties Telephone Company is making many improvements in this city. The outside plant is being rebuilt and new cables placed. When the outside work is completed a new switchboard will be installed in the exchange.

CHANDLER, IND.—The Chandler Telephone Company is getting ready to begin the construction of its line into Boonville.

ELWOOD, IND.—The Delaware and Madison County Telephone Company of Fort Wayne is making many extensions of its rural lines in this vicinity.

NEW ALBANY, IND.—The Home Telephone Company is constructing a telephone line between this place and Corydon.

WARSAW, IND.—The Commercial Telephone Company is greatly improving the toll line from Warsaw to Wabash, and more than 1,000 cross arms are to be replaced between the two cities. The company has an all-copper circuit from Milford through Warsaw to Wabash.

HAMPTON, IA.—The Iowa Central Telephone Company will install a new switchboard in the central office in this city. H. S. James, of Hannibal, Mo., has been appointed manager.

KELLOGG, IA.—A cable system is being installed by the Kellogg Mutual Telephone Company.

THURMAN, IA.—A controlling interest in the Fremont County Telephone Company has been sold to T. C. Harris of Sidney by F. V. Peckenbaugh of Tabor. Mr. Harris will invest a considerable additional amount in improving and extending the system.

WEST FRANKLIN, IA.—Frank Pitlik of West Franklin is constructing a telephone line from West Franklin to Mount Vernon.

LYONS, KAN.—The Lyons Telephone Company is rebuilding its line to Saxman and will put in 40-foot poles the entire distance, 32 to the mile.

MASON, MICH.—The Mason & Okemos Telephone Company at a recent meeting voted to build a new line into Mason. The president, W. O. Wilson, resigned, his resignation to take immediate effect.

FAIRMONT, MINN.—The Fairmont Telephone Company will expend about $2,000 in improvements to its line.

OSSEO, MINN.—The Osseo Telephone Company is constructing three new telephone lines.

CHILLICOTHE, MO.—Announcement is made by the People's Telephone Company of a plan of improvement and extension that contemplates giving Chillicothe a thoroughly modern system. It is the company's intention to begin at once the rebuilding of the Chillicothe plant, installing a central energy switchboard and complete metallic circuit on all telephones.

MILES CITY, MONT.—The Miles City-Forsyth Telephone Company's line is completed into this city. It is now the intention of the company to build west from Forsyth to Custer.

BINGHAMTON, N. Y.—The Delaware Valley Telephone Company is extending its lines throughout the county, and making many improvements.

JOHNSTOWN, N. Y.—The directors of the Glen Telephone Company have voted to expend $5,000 in building a new line between Fort Plain and Canajoharie and to open exchanges in these places in the fall.

FARGO, N. D.—The North Dakota Independent Telephone Company is making many improvements and extensions in the vicinity of Cleveland, N. D.

LOMA, N. D.—A farmers' telephone line is being constructed between this city and Nekoma. It is also proposed to extend it to Langdon.

MEDINA, N. D.—The Central Telephone Company, recently organized here, is arranging to extend its lines north to Sykeston in Wells county, south to Lehr in Logan county, east to Jamestown and west to Sterling. President Dwyer has also decided to make extensions of the rural lines already established and in operation.

MARYSVILLE, OHIO.—The Union County Telephone Company is making many improvements and extensions, and will entirely rebuild its lines in Marysville and vicinity in the next two months. About $8,000 will be spent.

ALLENTOWN, PA.—The Inter-State Telephone Company is extending its lines from Newfield through Malaga, Forest Grove and other small country towns and villages.

HUMBOLDT, TENN.—Dissatisfied customers of the Cumberland Telephone & Telegraph Company in the vicinity of Humboldt are contemplating the organization of an Independent company and the construction of a new telephone system.

SALT LAKE CITY, UTAH.—Hugh Thomas, superintendent of the Utah, Nevada & Idaho Telephone Company, is making arrangements to build lines at once to Ely and Pioche. The company expects to take over the plant and toll lines of the local company at Pioche, and will continue to build until the state has a thorough telephone system.

CHELSEA, VT.—The directors of the Orange County Telephone Company have decided to build a trunk line from East Montpelier to Plainfield. The work will be under the direction of Henry Daniels, of East Montpelier.

BERKELEY, VA.—The Planters' Telephone Company, which is now operating a system of telephones in connection with the Southern States Telephone Company of Norfolk, has decided to extend its lines from Great Bridge to South Norfolk via the old road, which will form a complete loop and take in all residences and farms along that line.

JENSON, WIS. (R. F. D. from Saint Croix).—A new line has been erected in this city by the Saint Croix Valley Telephone Company. It will be known as the R. A. line.

MARSHFIELD, WIS.—The Marshfield Telephone Exchange will make many improvements in its system in the near future.

PORTAGE LA PRAIRIE, MAN., CAN.—The Manitoba Telephone Commission has secured 40 subscribers in the rural municipality of Portage la Prairie and will at once arrange for the construction of a telephone system with the central office at Oakville.

DURANGO, MEX.—Pueblo Nuevo, a large mining district west of here, is now endeavoring to establish a telephone system from that point to Chavaria, a town some fifty kilometers distant, where there is a federal telegraph office. This will put it in direct communication with this city.

ELECTIONS.

OZARK, ARK.—The annual meeting of the stockholders of the Home Telephone Company was held recently and the following directors were elected for the ensuing year: W. L. Wagner, J. T. Greer, W. J. Pindergrass, L. L. Ford and M. B. Conatser.

LIVINGSTON, ILL.—A meeting of the Livingston County Telephone Association was held recently and the following officers were elected: Dr. Ross, Saunemin, president; John Blue, Cornell, secretary; Edward Crego, Pontiac; L. B. Slyder, Flanagan; Wm. Shafer, Ocoya, were elected members of the executive committee.

PIKE, ILL.—The seventh annual meeting of the Pike Township Telephone Company was held recently and the following directors elected: J. D. Klein, Henry Brinkman and J. H. Crabb. The vote to incorporate the company was carried.

MONROE, MICH.—At the annual meeting of the stockholders of the Stoddard-Osgood Telephone Company the following officers were elected: President, Warren Stoddard; vice-president, Boyez Dansard; secretary-treasurer, Harry S. Stoddard.

SAGINAW, MICH.—At a meeting of the directors of the Saginaw Valley Telephone Company, George E. Wedthoff of Bay City was elected a member of the board.

ARROW ROCK, MO.—The stockholders of the Arrow Rock Telephone Company elected the following officers at their annual meeting: S. Y. Thornton, president; E. P. Morris, vice-president; Bascom Diggs, secretary D. Lawless, treasurer, and M. S. McGuire, director for a term of three years.

WOOSTER, OHIO.—The Wayne County Telephone Company has elected the following directors for the ensuing year: W. H. Fair, Walter Smith, Henry Kountz, Geo. Walter, Jacob Miller, John Koehler, A. W. Brenneman, George Fike, J. W. Bupp, D. W. Fraze, S. L. Franks, J. M. Cook, S. W. Lehman, C. O. Smith, S. G. Spangler, George Barnard and John Etling.

BONESTEEL, S. D.—The stockholders of the Gregory County Interstate Telephone Company have elected the following directors for the ensuing year: E. A. Jackson, Dallas; C. B. Young, Dixon; W. A. Kinnie, Burke; Louis Simmons, Herrick; S. M. Lindley, Bonesteel; Herbert McKee, Gregory; C. A. Johnson, Fairfax; Frank Mullen, Lucas; William Krotter, Stewart, Neb. The board of directors elected the following officers: William Krotter, president; C. A. Johnson, vice-president; S. M. Lindley, secretary and treasurer; I. R. Lindley, assistant secretary, and G. H. Meredith, general manager.

BROADHEAD, WIS.—At the annual meeting of the Broadhead Telephone Company the following officers were eleteed: President, J. C. Murdock; vice-president and treasurer, A. Broughton; secretary, S. J. Stair; superintendent, O. C. Shultz.

MISCELLANEOUS.

JONESBORO, ARK.—A. W. Hall wants a manager for an automatic telephone system with 600 automatic telephones and 300 manual grounded party lines. A married man who has had automatic experience is preferred, but this is not essential.

GREEN RIVER, ILL.—The Green River Telephone Company is figuring on the installation of a new switchboard, as the old one is becoming inadequate for the service.

PEKIN, ILL.—The Farmers' Mutual Telephone Company has entered into an arrangement whereby it will purchase the old Peoria, Pekin and Tremont line, which is commonly known as the Hayward line in Tremont. The directors of the Farmers' company have been negotiating for this line for some time, preferring to purchase it than to build an entirely new line. With the old line in its control will be able to install about 300 instruments at once, and this number will be augmented by 300 more within a very short time.

ADEL, IA.—C. R. Hill, manager of the Linden & Adel Telephone Company, has made arrangements to move the company's office in Redfield to accommodate several rural lines which operate in the vicinity. This is expected to result in greatly increased business.

PORTLAND, MAINE.—Announcement has just been made at Portland, Maine, that the New England Telephone and Telegraph Company has purchased a controlling interest in the Northeastern Telephone Company, of Portland, the Lewiston & Auburn Telephone Company, of Lewiston, and the Cumberland Telephone Co.

AITKIN, MINN.—The Aitkin Telephone Company is preparing to move its exchange into new quarters. All lines entering the exchange will be cabled and provided with modern terminal equipment.

HALE, MO.—The Hale Telephone Company has obtained a building here and will at once install its exchange.

BURR, NEB.—The Brown Brothers' Telephone Line here has been sold to J. E. Coddington, who will assume active charge at once.

KERMIT, N. D.—The farmers in this vicinity are agitating the question of organizing a telephone company for the purpose of constructing a line to Willow Lake.

WHITNEY (P. O. Winifred), N. D.—The directors of the Whitney Telephone Company are contemplating the purchase of the Anderson Telephone Company, of Sherwood.

LEOLA, S. D.—The Western Mutual Telephone Company is transferring its exchange to Langs' building.

MARION, S. D.—The complete system of the Marion Telephone Company has been purchased by the Hurley Telephone Company.

REGINA, SASK., CAN.—Premier Scott announced at a recent meeting that it is the intention of the Saskatchewan government to purchase the telephone system owned by the Bell company in that province.

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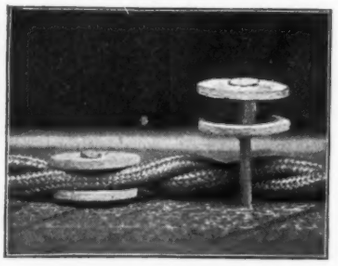

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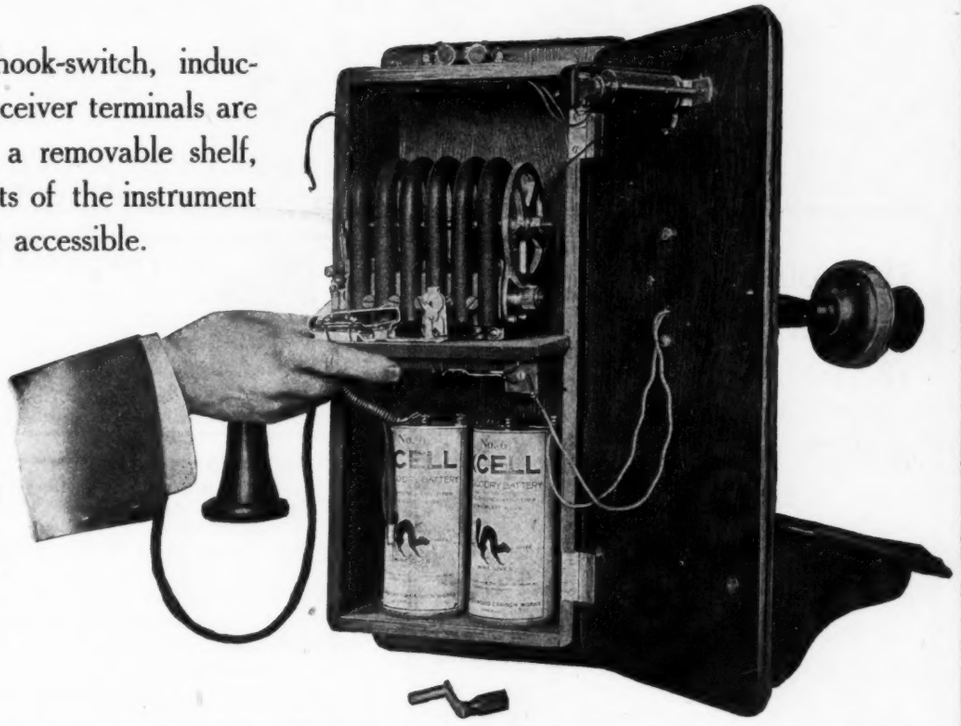

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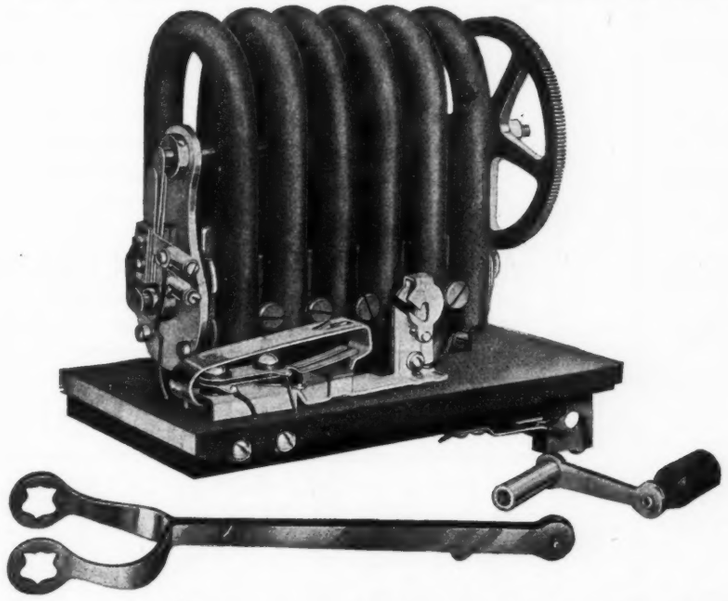

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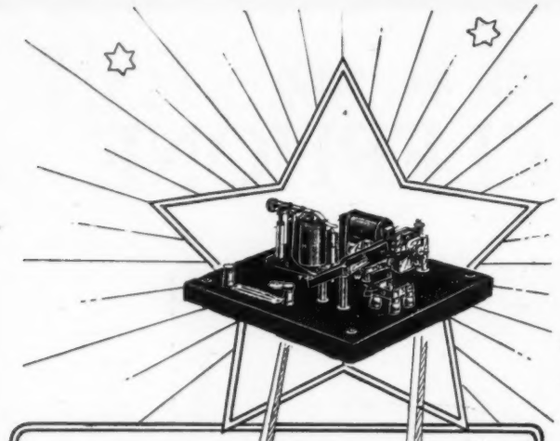

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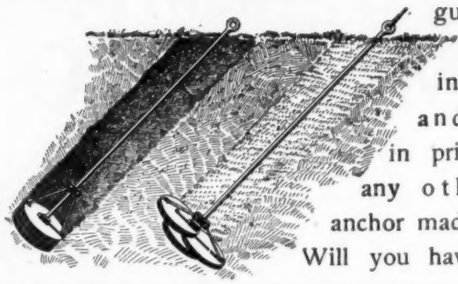

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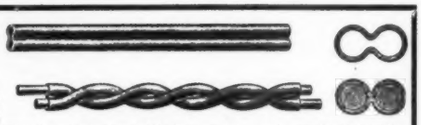

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150	"	5"	18'	1900	"	6"	30'	8	"	8"	45'
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800	"	4"	20'	50	"	8"	30'	14	"	7"	50'
1900	"	5"	20'	450	"	6"	35'	5	"	8"	50'
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Beginning with a convincing presentation of the advantages of cost records to telephone companies and to contractors for telephone work, Mr. Mayer presents a simple and comprehensive system for collecting, analyzing, and recording telephone costs, showing forms and blanks for every division of the work and explaining the method of computing, proportioning and pro-rating costs of all kinds. Successive chapters describe methods of construction for pole line, cable construction, cable splicing, removing old line and renewals, underground conduit, and miscellaneous structures.

Costs are given for every part of the work, these costs being averaged from actual cost records kept on many hundreds of jobs. To illustrate, the costs on conduit work are averaged from actual costs kept on over 250,000 feet of underground main conduit and laterals and over 500 vaults. The costs on classes of work are based on similarly extensive records. Moreover, these costs are itemized and classified. Work in city streets, in suburban towns, on long distance toll line, and on farmer line is given separately. The costs of pole line construction are given separately for each kind of soil and each size of pole; the costs of conduit work are separated for each kind of soil, each number of ducts and each class of streets; the costs of cable splicing are kept separate for each kind of splice.

This careful classification and analysis is carried throughout every division of telephone construction. The costs are actual construction costs—not contract prices—and have been used for making hundreds of estimates. Moreover, the author in a concluding chapter tells how to use the costs as given in making estimates, taking an actual job of large size and working out the estimate in detail with clear explanations of all the considerations to be kept in mind.

This book is by all odds the most complete and systematic record of costs for any one class of construction work that has ever been published. The announcement of its preparation has brought a large number of advance orders and numerous inquiries from telephone officials and contractors for telephone work, and its sale among users of telephone construction supplies, materials and tools will be large.

The book is divided into eight chapters and two appendixes as follows:

CHAPTER I.—METHODS AND COST OF POLE LINE CONSTRUCTION.—Construction Details: Poles — Cross Arms—Arches. Stubs and Anchor Guys—Push Pole Braces —Wire Stringing. Collecting and Reporting Cost Data: Method of Collecting—Method of Reporting. Method of Figuring Line Construction Cost: Method of Proportioning Lost Time—Method of Proportioning Supervision and Expense—Method of Proportioning Teaming. Construction Cost Data: Wages—Classifications of Soils—Construction Costs.

CHAPTER II.—METHODS AND COST OF CABLE CONSTRUCTION.—Construction Details: Sizes of Cable—Erecting Messenger—Aerial Cable—Equipping Cable or Terminal Poles—Wiring Cable or Terminal Poles—Rodding Underground Cable—Main Underground Cable—Lateral Underground Cable—Forms for Reporting Costs—Cable Work Costs.

CHAPTER III.—METHODS AND COST OF CABLE SPLICING.—Classification and Definitions: Straight Splices—Bridge Splices—Straight-Bridge Splices. Construction Details: Materials—Instruction for Making Splices—Straight Splices—Bridge Splices—Straight-Bridge Splices—Changing Count—Aerial Cuts—Splicing Toll Cable Into Cable Terminating in a Loading Coil on Pot—Potheads for Terminating Aerial Cables—Potheads for Connecting Main Cable to Distributing Rack Cables—Connecting Cables for Distributing Rack—General Order of Making Splices. Forms for Reporting Costs: Explanation—Method of Figuring Cable Splicing Costs. Cable Splicing Cost Data.

CHAPTER IV.—METHODS AND COST OF REMOVING OLD LINE AND OF RECONSTRUCTION.—Removing Old Line—Removing Poles—Removing Cross-Arms—Removing Wire—Removing Messenger—Removing Aerial Cable—Removing Underground Cable. Reconstruction: Method of Recording Costs—Method of Figuring the Cost of Removing Materials and of Reconstruction—Construction Cost Data.

CHAPTER V.—METHODS AND COST OF CONSTRUCTING UNDERGROUND CONDUIT.—Hints on Cost Keeping Methods—Organization of Working Force. Construction Details: Divisions of Underground Conduit Construction—McRoy Tile Conduit—Pump Log Conduit—Sewer Tile Lateral Conduit—Vault or Manhole Construction. Forms for Recording Costs of Conduit Work—Methods of Keeping Underground Conduit Construction Costs—Method of Figuring Underground Conduit Costs—Underground Conduit Cost Data.

CHAPTER VI.—DETAILED COST OF CONSTRUCTING 824,862 DUCT FEET OF UNDERGROUND CONDUIT AND 318 VAULTS IN ONE JOB.—Method of Collecting and Recording Costs—Comparison of Foremen—Vault Construction—Construction Cost Data.

CHAPTER VII.—MISCELLANEOUS COSTS AND SPECIAL DATA.—Line Construction. Special Examples—Pulling Cable—Materials and Labor Costs—Erecting Terminals —Fusing—Wheelbarrow Loads—Shrinkage of Mortar and Concrete—Comparative Cost of Hand and Machine Mixing —Materials and Labor in Concrete Vaults—Comparison of Different Duct Sections—Brick Vault Data—Costs Per Mile of Farm Line—Costs Per Mile of Toll Line—Costs of Aerial Cable—Costs of Underground Cable.

CHAPTER VIII.—PRACTICE OF ESTIMATING.—Discussion of Various Systems for Collecting Cost Data—Estimating Labor—Estimating Material—Estimating Material to be Removed—Summary—Forms for Estimating.

APPENDIX A.—COST OF MATERIALS AND LABOR IN CONSTRUCTING TELEPHONE LINE.—Messenger Construction — Aerial Cable Construction—Underground Cable Construction—Cable Splicing Underground—Terminals—Cable Boxes—Exchange Poles Class A—Exchange Poles Class B—Exchange Poles Class C—Toll Line Poles Class E—Farmer Line Poles—Wood Anchor Logs—Wire Stringing—Underground Conduit Specifications — Conduit Costs—Manholes.

APPENDIX B.—MISCELLANEOUS COST DATA ON POLE LINE AND UNDERGROUND CONDUIT CONSTRUCTION.—Cost of Two Short Telephone Lines—Labor Cost of High Power Transmission Line—Cost of Excavating Trolley Pole Holes by Machine—Method and Cost of Digging 600 Trolley Pole Holes—Electrical Conduit Construction at Memphis, Tenn.—Cost of Electrical Conduits, Baltimore, Md.—Cost of Constructing Conduits in Subway Retaining Walls.

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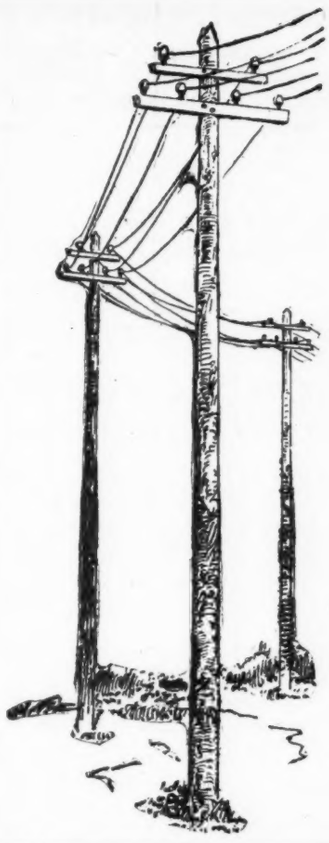

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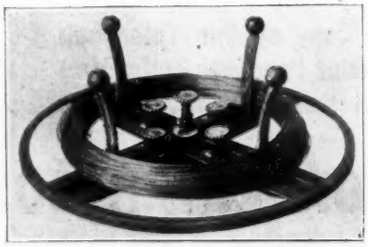

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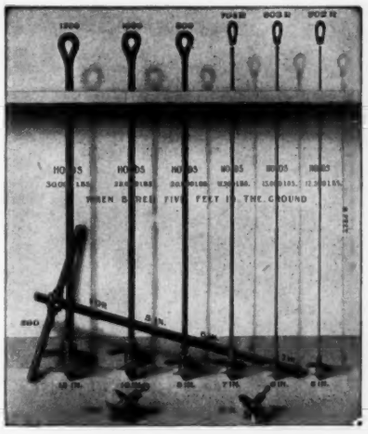

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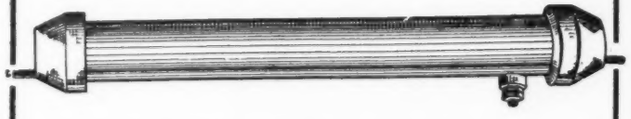

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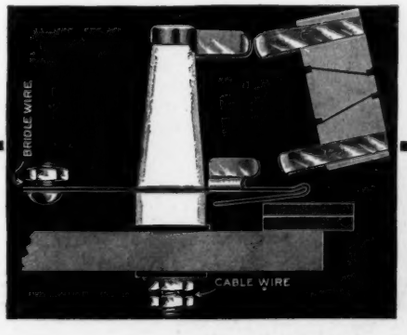

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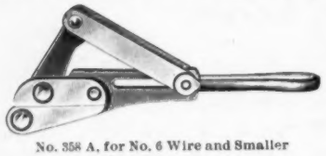

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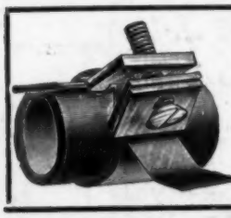

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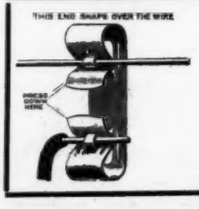

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